

# THE MARINE RECORD

ESTABLISHED 1878

VOL. XIX. NO. 28.

CLEVELAND—JULY 9, 1896—CHICAGO.

\$2 PER YEAR. 10c. SINGLE COPY

## THE NEW BATTLESHIPS.

The Navy Department has issued the official circular containing the requirements for the proposed battleships, each of about 11,000 tons displacement; length on load water line, normal displacement, 368 feet; moulded breadth at load water line, 72 feet; mean draft, 23½ feet. They are to have freeboards between the 11 feet of the Indiana class and the 19 feet of the Iowa class, about 16 feet. This freeboard was recommended by the Walker Board, which reported as its opinion that the Indiana was too low in the water for the operation of her guns in all kinds of weather, a criticism refuted by Capt. Evans, commanding the vessel, who says that he passed through a gale some months ago, one of the worst he has ever seen, and yet the guns of the battleship could have been operated without difficulty. An appropriation of \$3,750,000 is made for the construction of each vessel. The armament is to be paid for out of a separate appropriation. Bids are invited on plans prepared by the department, and on those submitted by the bidder.

The department's design contemplates driving the vessel by twin screws. The engines to be of the vertical triple-expansion type, two in number—one on each shaft—and in two compartments. The boilers to be single-ended, eight in number, and placed in four compartments. The speed to be maintained at sea for four consecutive hours is to be not less than an average of 16 knots an hour. The hull is to be of steel, not sheathed, with double bottom and close watertight subdivision. The arrangements of decks above water are to provide ample freeboard and berthing accommodations. It is contemplated to fit two military masts with fighting tops, to carry no sail. Each ship is to have two smoke-pipes, which are to be in line athwartships, a position much affected by the British in their vessels. The two turrets for the 13-inch guns, which are to be mounted in pairs, will be located on the central line forward and aft, and the fourteen 6-inch guns will be mounted behind a superstructure on the main deck and on an upper deck. The secondary battery of sixteen 6-pounders, four 1-pounders, four machine guns, and one field gun will be distributed about the ship where they will be of the most service. The protection of the hull against injury to the water-line region is to be afforded by means of a side armor belt of a mean depth of 7 feet 6 inches and a maximum thickness throughout the engine and boiler spaces of 16½ inches. From thence forward it may be tapered gradually to a uniform thickness of four inches. The transverse armor at the after end of the belt and just forward of the boiler will not be less than 12 inches in thickness. Barbettes for 13-inch guns will have armor 15 inches thick, except in the rear, where it will be reduced to 10 inches. The turret armor is to be 17 inches thick in front, and 15 inches elsewhere. The ship's side, from the armor belt to the main deck, will be protected by not less than 5½ inches of steel armor, from barrette to barrette. Coal is to be carried back of a portion of this 5½-inch casement armor. A protective deck, ranging from 2¾ to 5 inches in thickness is to extend throughout the length of the vessel. A cellulose belt is to be fitted along the sides of the whole length of the ship. A conning tower of not less than 10 inches in thickness, having an armored communication tube not less than 7 inches in thickness will be carried in a suitable commanding position forward. An additional armored station will be fitted aft, having armor not less than 6 inches in thickness. The fourteen 6-inch guns on the main and upper deck will be protected by 5½-inch armor, with 1½ inch splinter bulkheads between guns. Protection is to be afforded the sixteen 6-

pounder and four 1-pounder guns by shields and extra side plating. The supply of ammunition will consist of 200 rounds for the four 13-inch guns; 2,800 rounds for the 6-inch; 10,000 rounds for the 6-pounder; and 2,400 rounds for the 1-pounder. The torpedo outfit is to consist of four broadside tubes, eight torpedoes, and suitable allowance of gun cotton for mines and miscellaneous purposes. The torpedo tubes will be placed two on each broadside. The total coal bunker capacity is to be such that at least 1,200 tons can be carried with loose stowage without trimming by hand. Quarters are to be provided for 600 men.

A table is included in the circular, giving the principal weights to be carried. For the armament of the ship 550 tons is allowed; for ammunition, 437 tons; and for machinery, 1,133 tons. The other weights are distributed among torpedo outfit equipment, etc. The complement of officers and men is to be 490.

If the speed falls below 16 knots and exceeds 15 knots per hour, the vessel will be accepted at a reduction at the rate of \$25,000 per ¼ knot to 15½ knots, and \$50,000 from 15½ knots to 15 knots. If the speed falls below 15 knots per hour, the vessel will, in the discretion of the Secretary of the Navy, be rejected, or accepted at a reduced price.

The contractors will be required to complete the vessels within three years from the date of the execution of the contracts. In case of delay a penalty will be imposed ranging from \$75 to \$200 per day for the first three and after the first six months respectively, beyond the date of contract completion. The machinery to be supplied to the ships will weigh 1,050 tons, and in case of excess of weight in this feature, the contractor will incur a penalty of \$500 per ton of such excess, and if the total weight be exceeded by five per cent, a further penalty of \$10,000 will be exacted.

From information which has reached the Navy Department, the belief prevails that there will be at least three bids submitted on the proposed vessels—Cramps, Union Iron Works and Newport News Shipbuilding Co. The latter firm secured the contracts for the construction of the Kearsarge and Kentucky at its bid of \$2,250,000 each. It is expected that the contracts for the proposed battleships will be awarded at about the same figures. From the many replies to the circular letters sent out by the department less than two weeks ago, it is the belief that there may be even more competition.

## COAST AND FOREIGN SHIPBUILDING.

The new steamyacht which Robert Goelet, of New York, has ordered from J. & G. Thomson, the Scotch builders, is to be a vessel of 1,750 tons, with twin screws and triple-expansion engines to drive her 18 knots. She will be very similar to the yacht now nearly ready for launching at the same yard for Ogden Goelet.

Plans have been made by Harlan & Hollingsworth for a new Sound steamboat for the Providence & Stonington Steamship Co. She will be named Vermont, and is to surpass the present boats on that line. Her length will be 400 feet and she will be supplied with twin screws and triple-expansion engines.

The new steel steamers Mohawk and Mohegan, built at Chester for the Central Vermont railroad, have been put in commission. They are 280 feet long, 60 feet beam and are equipped with triple-expansion engines, electric lights and steam steering gear. Both vessels will ply between New York and New London, Conn., displacing the boats now in service there. The new vessels are guaranteed to make the run between the above ports in 7 hours, as against 10 and 14 hours heretofore.

## STEEL FORGED SHAFTS AND SPEED.

That there is a growing sentiment in favor of high class steel forgings in preference to wrought iron is no news to anybody. The makers of steel forgings are, however, engaged in an aggressive crusade on the Great Lakes, to place these forgings in vessels in the shape of shafts, connecting-rods, crank-pins, etc., it being an almost weekly occurrence for one of the last named to break when made of wrought iron. The distinct advantages of steel forged shafts are not to be doubted after the experience of the past few years. The Bethlehem Iron Co. replaced with steel the old shafts in the steamships City of Paris and City of New York, when they were bought by the American Line, after which each of them beat all previous records on their first trip across the ocean. And now the City of St. Louis and City of St. Paul, also equipped with steel forged shafts, hold the present records, even when compared with ships of much greater horse power.

Here is a quotation from a letter written by Mr. Irwin M. Scott, general manager of the Union Iron Works, San Francisco, Cal.:

"The requirements for the crank and propeller shafts for the U. S. cruiser San Francisco, called for 68,000 pounds tensile strength, and 28 per cent elongation. This was exceeded in every shaft, some of them going as high as 73,000 pounds, and 33 per cent elongation, requiring a special request by the Union Iron Works to the Secretary of the Navy, to permit of their being used on account of having exceeded the limit allowed by the specifications, being at that time better than any shafts known. The shafts for the cruiser Olympia, whose engines developed 18,000 horse power, distributed this horse-power by two shafts to the propellers, making 140 revolutions every minute. These shafts, for their size and sectional area, have delivered the largest horse-power of any shaft in the American navy. The superiority of material and workmanship in shafts furnished by the Bethlehem Iron Co. has undoubtedly been largely conducive to the fact that the Oregon, Baltimore and other vessels recently turned out by Cramp & Sons and the Union Iron Works have developed higher speed than any other vessel of their class in the navy."

## HONORS FOR COMMODORE MELVILLE.

In recognition of the achievements of Engineer-in-Chief George W. Melville in the science of mechanical engineering, the trustees of the Stevens Institute of Technology at the commencement have decided to confer upon him the doctor of engineering. Ten years ago Mr. Melville analyzed the conditions which were causing a revolution in naval construction, and almost single-handed he caused a policy of naval rehabilitation to be pursued which would make speed the cardinal element of design. This policy has been of greater import than the construction of successful war ships, for it was followed by the building of swift ocean greyhounds, the foundation step in the restoration of our merchant marine.

## FOREIGN UNDERWRITERS AGAIN HIT HARD.

The St. Louis and New Orleans Anchor Line is the possessor of a fleet of seven boats trading on the river between New Orleans and St. Louis. The boats have been insured by local companies for 13 per cent per annum, one-fourth of the risk being uncovered. A well-known British company came in a few months ago and took the fleet at 8 per cent., ¼ per cent per month laying-up returns, and giving full insurance. Three of the boats were total losses in the late tornado at St. Louis. This confirms the river insurance men in the belief that the tornado was a providential occurrence.



## NEWS AROUND THE LAKES.

## CLEVELAND.

SOME SAFETY GATES ERECTED WHICH HAVE LONG BEEN BADLY NEEDED—GOSSIP OF THE PORT.

CLEVELAND, July 9.

Brand new red safety gates have been erected at each end of the bridges over the main river at Main, Seneca and Center streets. They have been urgently needed for a long time and have now been put up after the usual amount of red tape has spun out, as one of the moral effects of last fall's Central Viaduct disaster. The delay in erection is the only fault to be found with the new gates, which give the best of satisfaction.

H. F. J. Porter, of Chicago, member of the Society of Mechanical Engineers, will read a paper on "How Steel Forgings are Made," before the Civil Engineers' Club of this city, Tuesday evening, the 14th. This paper is on a subject of great interest to civil and mechanical engineers, naval architects, shipbuilders and vessel owners. It will be illustrated with photographs and numerous lantern slides showing the process from the casting of the ingot to the finished product.

Since the old Willow street bridge has been torn away the bridge of the Cleveland Terminal & Valley Railway has been transformed into an auxiliary highway bridge, in addition to its regular duties. Readers familiar with the locality might pronounce this a very dangerous experiment, but the arrangement is really most excellent. The highway approach is to the right of the track on one side of the old river bed and on the other side is to the left of the track. The draw is thus closed to one of two positions. When it is used as a railway bridge it is closed to wagon traffic, and when it swings around so the vehicles may pass over, it ceases for the time to be a railroad bridge. Foot passengers manage to get across at almost any stage of the game.

Capt. William Faragher, of West Clinton street, who recently sold his schooner H. G. Root, has joined with his brother, Thomas Faragher, of Lorain, in the purchase of the little steambarge Dan Kunz. The Kunz will doubtless continue in the pig iron trade between Cleveland and the Johnson Co.'s steel works at Lorain.

The courts have made permanent the temporary injunction secured by the Rhodes & Beidler Coal Co. against the Erie Railway and the Erie Coal Transfer Co., which operates one of the Erie coal docks, and which it was charged, refuses to handle Rhodes & Beidler's coal for lake shipment. The injunction was made to apply also to Mr. J. V. Morris, who operates the other Erie coal dock.

Steamboat racing seems to be epidemic. The steamer Skater reports a thrilling contest of speed last Thursday with the Duluth, of the Euclid Beach Park Line. Both boats emerged from the river together, and set off toward the eastward, the Skater being bound for Ashtabula. The Skater when off Euclid Beach was fully ten lengths or about 900 feet ahead, by her own report. As the maximum speed of the Duluth is something less than eight miles per hour, this contest must have been a hair-raiser.

The excursion steamer Sailor Boy, which went to Buffalo a few weeks ago after leaving a short route on Lake Huron, arrived here Tuesday evening, under charter to Farasey & Marron, who placed her on the Cleveland-Port Stanley route, which has so far not been operated this season. The Sailor Boy will leave Cleveland on Mondays, Wednesdays and Fridays at 9 o'clock a. m., and will leave Port Stanley on Tuesdays, Thursdays and Saturdays at 11 a. m. She will give moonlight rides out of Cleveland the evenings of the days last mentioned, and will make excursion trips to Rond Eau on Sundays. THE RECORD has always been full of faith in the success of a route regularly established between Cleveland and Port Stanley, which would place Cleveland people much closer to their Canadian neighbors and draw them to see the many attractions offered by this city. Boats running heretofore on this route have been able to do well if their running expenses were not too high, and a good season is predicted for the Sailor Boy, even if times do not greatly improve.

In dwelling upon the heavy passenger business of the port last week we inadvertently omitted to mention the Grummond line boats, which have always been with us making weekly trips during the season, between Cleveland and Mackinaw Island, occupying a week on the round trip and touching at several of the way ports. This line is now represented by the steamer State of Michigan, which arrives every Friday morning and leaves the same night. This manner of making the trip is a very popular method of spending a week's vacation, and with all the sight-seeing an enjoyable rest is obtained.

In this same connection it is necessary to note that the little steamer Riverside is no longer on the Cleveland-Lorain line, having been sold by Mrs. E. W. Troup to L. P. & J. A. Smith. The Riverside will be converted into a tug, and will be used in connection with extensive contract work. She is admirably suited to the purpose, as she has large, roomy quarters for superintendents and inspectors of work. The Riverside measures 153 tons gross, and is 114 feet long by 25 feet beam and 9 feet depth. The Cleveland-Lorain route ought to be a

good one, and will probably be covered soon by another boat.

The Cleveland Dry-dock Co. held its annual meeting Monday, directors being chosen as follows: John F. Pankhurst, Luther Allen, H. A. Hawgood, J. B. Cowle, M. A. Hanna, L. C. Hanna. The board re-elected officers as follows: President, John F. Pankhurst; vice president, Luther Allen; secretary, treasurer, and manager, Capt. W. W. Brown.

The steamer Lagonda arrived Wednesday afternoon from Ashland with her maiden cargo—3,218 tons of ore. Capt. John Mitchell, her managing owner, was one of the party aboard and is enthusiastic over her behavior. Her engine is an especially superior piece of machinery, and she has already logged 14 miles an hour. The Lagonda was built in 87 days from the time the keel was laid to the date of delivery.

A distinguished party expect to come here in season to start next Sunday on the steamyacht Amadis on an easy cruise to Mackinaw, the Sault, and the Pictured Rocks. The party will include Postmaster-General Watson, Assistant Postmaster-General Maxwell, Public Printer Benedict; A. W. Machen, Assistant Superintendent of the Postoffice Department; Postmasters Baker, of Buffalo; Hutchins, of Cleveland; Enright, of Detroit; Harris, of Joliet, Ill., and a number of Toledo people. They will return to Cleveland about August 2.

## BUFFALO.

TROUBLE IN THE LAKE-LINES ASSOCIATION—DULUTH MILLS WILL TRY THE CANAL.

Special Correspondence to The Marine Record.

BUFFALO, July 7.

The dull time of the year is here for a certainty, and the lake people, as usual, appear to think that there was never such a time before, and that there will never be a return to a money-making basis again. It was ever thus. Someone is wise and thoughtful enough, though, to recall the fact that business was quite as flat a year ago as it is now, and that, too, after a spring a sight less profitable than this one has been. Buffalo has done her share of the business, especially in grain handling, which is to date the heaviest on record. There is now a stagnation in the movement of coal, and no promise of any improvement. One broker says that there will not be much coal moved this month. Lumber is also slow, but the receipts of iron ore are better than for some time.

They are after John Gordon once again, this time the New York Journal of Commerce being the first to fire. There is a significance in the new story they are telling that is quite apart from the thing they are aiming at and which is so far the main question, for no one has found out just what Mr. Gordon is up to, strange to say. The point is the increasing weakness of the lake-line association, which appears likely to go to pieces before the end of the season unless the railroad magnates take hold and save it. But this does not go to prove that Mr. Gordon is at work trying to cut down the rates, as has been reported. His steamer Globe is carrying coal and grain, and letting rates alone, as far as can be discovered.

And now comes in another element in the case. The Duluth millers are not going to pay the rates charged to New York if they can help it, and some time ago banded themselves together as the Head of the Lakes Milling Association. They have now sent their secretary, L. R. Wilson, here to arrange for shipping flour from here by canal. The experiment will be tried with five canal boat loads that will be here to-night on the steamer George Farwell, which belongs to the new Duluth flour line, but has not been here before this season. The venture is at the best a doubtful one. The roads will do anything to keep their hold on the flour trade, and they boycotted the last Duluth shipper who tried to go around them.

Black Rock is getting a reputation for receiving oats of late. It has been many a year since it has appeared as a lake port, and lest someone should wonder where it is or that it should seem to detract from Buffalo's glory, it should be said that Black Rock is in the midst of the city. It has a canal elevator of some pretension that is run by water power, and is thus a very unique affair, especially in regard to running cost. The steamer Westover, with 30,000 bushels, and the barge A. T. Bliss, with 40,000 bushels, are there now unloading.

It is decidedly amusing to find the papers of the different ports coming out so gallantly in defense of boats that happen to be built there or to hail from there. Detroit was certain that the City of Buffalo had laid out the North West, but Duluth gets up and fairly howls at the mere suggestion that there was a race. Of course it was all a deep-laid scheme to get free advertising. As far as Buffalo was concerned, most people were of the opinion that her namesake was the speedier craft, and it appears that there are high authorities in Cleveland of the same opinion; but so far as we were concerned, as both boats come here, and neither is managed here, it was the prospect of a race, pure and simple, that caught us mostly, and now that everybody in authority disclaims the thing, we are not a little disgusted.

Of course the Buffalo steamer Hodge, being a small craft, and not the most lucky in the world, couldn't be lost, as she was last Saturday on Lake Ontario, without the usual amount of "by-talk" of the load the insurance companies will now remove from the shoulders of the

owners when they come to pay for her. It is a little queer that she was never really paid for before she was a loss again in some way, which accounts in part for the poor opinion the insurance companies had of her.

Speaking of luck, we should not forget the canal packet line that runs from here to Rochester and Syracuse. It has already had three serious mishaps this season. One boat careened and went down in the harbor, wetting her cargo. Another, the Francis, burned here and injured her cargo. Now a third, the Johnson, is reported burned at Lockport. The line has just been incorporated, but has made quite a reputation and some money as an individual venture.

It is always bad for the reputation of a port for its docks to allow tonnage to become badly bunched at any of its docks, so when one of the Buffalo ore docks got caught in that way a short time ago everybody was afraid it would get out. Still it takes a smart bit of calculation to prevent it. One day last week nine ore cargoes went to Tonawanda, but it is, by no means likely that they were shipped on the same day, or that it appeared likely that they would run in together when they began to load.

It begins to look as though we would get a bridge across Buffalo creek after all. There have been all sorts of mishaps in getting in the foundations, and no end of money has been lost; but the water has been made to stay out of the north side abutment crib at last, and the stone are now going into place.

The L-high Valley ore dock is now the best equipped dock for handling ore in the city. Three new hoists were put in operation Monday morning, the steamer City of Bangor, with 3,200 tons, being the first boat. This dock has now six hoists, and their facilities for handling ore with quick dispatch can be compared favorably with any.

The old steamer George L. Colwell and her boiler have both been down here within a few days, but no longer together. The Colwell accompanied another dismantled steamer, the G. W. Johnson, in the Hayward tow, and the boiler came in the George Farwell. This is the second childhood of a steamboat to give up her machinery to a new hull and be towed the rest of her days.

JOHN CHAMBERLIN.

## CHICAGO.

GRAIN FREIGHTS BEGINNING TO BE A LITTLE STEADIER—ACCIDENT TO THE SCHOONER MANITOWOC.

Special Correspondence to The Marine Record.

OFFICE OF THE MARINE RECORD, CHICAGO, July 8.

Grain freights are steady on a basis of 1½c on corn to Buffalo. Receipts of grain are rather liberal, and but for the down grade of ore freights which drives a surplus of tonnage to this port, no doubt grain freights would be firmer and higher.

Carr & Blair chartered the schooner James G. Blaine for corn to Port Huron, at 1½c.

James A. Calbick & Co. chartered the steamer Toltec and consort Miztec for corn to Kingston at 2¾c.

Capt. John Prindiville chartered the steamer Norwalk for corn to Kingston at 2¾c; steamer O. T. Flint and schooner E. B. Maxwell for corn to Port Huron at 1½c.

J. J. Rardon & Co. chartered the Aragon for corn to Port Huron at 1½c; the G. G. Hadley and City of London, for corn to Buffalo at 1 3-16c.

H. W. Cook & Co. chartered the steamer Aztec and consort Zapotec for oats to Black Rock at 1½c.

The steamer Joseph L. Hurd, Capt. Wm. Boyd, arrived here last Thursday afternoon with 750,000 feet of lumber. She had on a monstrous deck load, which was about 19 feet above her rail.

C. R. Jones, of Cleveland, was in this city Monday. He came here from Milwaukee, where he had arrived on the new steamer Aragon, which steamer will come here to load grain, as soon as her cargo of 2,500 tons of coal is discharged.

The schooner Manitowoc, Capt. Fred Watson, lumber laden, was going up the south branch of Chicago river Monday afternoon about 4 o'clock in tow of two of the Independent Tug Line tugs, and when going through Twelfth street bridge had her mizzen mast carried away by collision with the bridge, in consequence of the bridge being closed when the schooner was about half way through the draw. Captain Watson's wife and family narrowly escaped injury or death, as the mast fell within a few feet of them. THOMAS WILLIAMS.

## DULUTH AND SUPERIOR.

INTERESTING DATA OF THE JUNE BUSINESS AT THE HEAD OF THE LAKES—A HANDSOME PRESENT.

Special Correspondence to The Marine Record.

DULUTH, July 7.

The Pennsylvania & Ohio Fuel Co.'s dock is again at work receiving coal, the hoisting apparatus having been repaired. A small cyclone on May 13 last caught the machinery, which is of the Brown make, and dumped the whole of it in a confused mass on the dock. It had been supposed that it would require only three weeks' time to repair the damage, but a strike among the employees of the Brown company delayed matters. The first coal since then was unloaded yesterday. Consider-



able West Virginia coal is coming in now. Receipts have been fairly large, but not extraordinarily so.

There were 526 arrivals and 520 clearances of vessels at and from Duluth and Two Harbors during the month of June. The total amount of freight handled was 992,891 tons against 822,928 tons for the preceding month. The ore shipments for June exceeded those of the month of May by nearly a quarter of a million tons. The shipment of lumber from Duluth for June was not as heavy as during May, but the amount was very large, being 34,807,000 feet. The total amount of lumber that has gone forward by the lake route since the opening of the season is about 85,000,000 feet. There were also shipped from Duluth during June 3,723,000 shingles. Superior shipped more lumber during June than in the preceding month, but the figures were not available.

Duluth grain shipments for June were as follows: Wheat, 620,632 bushels; barley, 118,883 bushels; oats, 315,000 bushels; rye, 40,000 bushels; flax, 287,200 bushels; flour, 272,817 barrels. Included in the receipts were 16,834 barrels sugar, 31,839 barrels salt, 22,300 staves, 231,426 pounds fish plate, 16,836,000 feet logs.

Capt. W. J. Green, of the Mitchell & McClure tug Ada Barrett, received a handsome pair of marine glasses last week, the gift of his crew, who have been with Capt. Green for the last five seasons. Capt. Green is very popular with his men, who have good reason to like him.

#### DETROIT.

THE FREIGHT DEPRESSION OPTIMISTICALLY CONSIDERED—FRONTIER IRON WORKS SPREADING OUT—NEED FOR FURTHER RAFTING LEGISLATION.

Special Correspondence to The Marine Record.

DETROIT, July 8.

Some of the older heads in this city are disposed to take things with regard to freights easily. One in speaking to the RECORD said: "Some 30 years since, when I first bought into vessel property, I remember the year at the close of which I invested paid about 50 per cent on the capital invested in the vessels of that time. The next year, my first in holding stock, I was assessed \$400 to pay my share of the losses. Freights jumped from way up to way down, and there has never been any rule except the one of supply and demand that I know of. The year before I bought in they were paying \$6 a thousand on lumber from Bay City to Lake Erie. The next year we could not pay expenses. So far this year there has been nothing to complain of, leaving out the last two weeks, and I look for a slight rise in August, with a more pronounced one as the season advances. After all we cannot control supply and demand, but must make money when boats are badly wanted, and stand it as best we can when they are not."

The Merida's engines at the Frontier Engine Works will be ready to take down the end of this week, and they will be transferred as fast as possible to the steamer. The Frontier Engine Works are forced to add another story to their plant, as their business is so heavy that they even now cannot take care of all of it. For the past two years they have been obliged to turn away orders for radiator valves, and it is their intention to try to take care of that trade from this time forth. They are running day and night, and one of their firm said they fairly grudged the Fourth of July, they needed the time so much. All spring they have been busy mak-

ing small repairs for vessels, and they have just completed new wheels for the Uganda and Samuel Mather. A part of their business which is to play a very prominent part in the future is the making of gas engines. They have added about \$20,000 worth of new machinery to their present equipment, and will manufacture for small marine, electric and station engines. There is a constantly increasing demand for this kind of machinery. They are also enlarging their brass department, where all kinds of castings for engines are made. The whole business is flourishing, and they say they could not well take care of a greater volume of business just now if it was offered.

The City of Mackinac, on her last trip up, ran into some logs near Port Lampton, on the St. Clair River, and bent several braces and sprained her starboard wheel. The great carelessness displayed with logs in much traveled waterway should call for legislation to govern the usages allowed.

The steamer Unique ran into a log and broke her wheel a few days since.

Captain Arthur J. Fox, of the Frank E. Kirby, is lying very ill of typhoid fever at Harper Hospital. His condition is as favorable as can be expected under the circumstances, but some days must elapse yet before he can be declared on the way to recovery.

C. W. Norton is doing some chartering, but finds it hard to get cargoes to keep boats going.

The Michigan Naval Reserve is now off for their annual drill, at Mackinac Island. Last year they slept ashore, but this year they are to remain on board all the time, and part of the Michigan's crew are temporarily quartered at Fort Wayne during their absence.

The Windsor & Sault Line is fast growing in favor, and the wild and picturesque spots their boats call at will soon become widely known. Georgian Bay is destined to become a very popular summer resort. McC.

#### SAULT CANAL TRAFFIC FOR JUNE.

The June statement of the traffic for June of the two canals at Sault Ste. Marie shows that nearly five and one-half millions of tons of freight passed through, in 3,210 boats; certainly not a bad record, nor exactly in keeping with a dull season, which once more points out that under conditions of continued good weather, which minimizes both losses and delays, the principal trouble with lake commerce is that the increase in carrying capacity is out of all reasonable proportion to the growth of the lake trade, which, in itself, is certainly not to be complained of.

The amount of ore brought down from Lake Superior still shows an increase over the same period of last season, although the increase for June is not so great as that shown in the May comparisons. There were 1,418,231 gross tons brought down in June, as compared with 1,329,976 long tons in June, 1895. For the season to July 1 the comparison is 2,617,592 tons this year, and 2,268,484 tons last. This shows an all-sufficient reason why, with sales so much smaller than last year, ore shipments should be so curtailed.

Coal shipments prove to be much heavier than had been counted on, the shipments of both hard and soft

coal being considerably over twice what they were for the same month last year. The total hard coal shipments to July 1 this year were 136,191 tons, as compared with 81,304 tons to July 1, 1895. The increase in soft coal shipments figures up some 300 per cent, 831,403 tons having been sent to upper lake ports this season as compared with 229,757 tons last year. Flour shows a falling off of nearly 25 per cent, while wheat shipments are more than three times what they were last year, to say nothing of the shipment down the lakes of about 7,500,000 bushels of other grains, as against nothing at all reported last year. Miscellaneous freight shows a uniform increase of 25 to 33 per cent over last year, and the number of passengers shows a slight increase. Readers are referred to the table for details.

#### NOTICE TO MARINERS.

CHANGE OF RANGE LIGHTS.

My range lights on Waiskai Bay and Birch Point will, on July 15, be changed from red to bright lights. The lights will also be raised a great deal higher than they are now.

LEO BERNARD.

Sault Ste. Marie, June 30, 1896.

#### FLOTSAM AND JETSAM.

The new lighthouse at Port Clinton is nearly finished. A sounding board has been put on the shoreward side of the Manitowoc fog whistle.

Capt. Day McLeod, manager for the Inland Lloyds, has gone east to spend a month.

Admiral Ramsey, of the navy, is expected to make a tour of this lighthouse district on the Haze.

The Ella M. Smith towed a raft of 4,500,000 feet of logs from Spanish River to Bay City last week.

The St. Clair-Erie Ship Canal Co., which allowed its charter to die of inanition, is working at Ottawa to have it revived.

The Belle Cross has been seized at Sandusky on a libel filed at Cleveland for the payment of \$2,132.83, claimed to be due on a fuel bill.

Capt. John D. Sullivan, who has sailed the lakes for fifty years, has retired from the command of the Grand Trunk ferry steamer Landsdowne at Sarnia.

Capt. Hugh Chisholm died at Meaford, Ont., last Monday at the age of 72 years. He was one of the pioneer shipbuilders and navigators on the Canadian side of the Great Lakes.

City Attorney Hamilton, of Milwaukee, has made a ruling that the boats of the Goodrich Transportation Co. are assessable in Milwaukee, and not at Kenosha, from which port the boats hail.

The Hydrographic Office is issuing a new pamphlet which embodies the provisions of the White law and also of the rules for navigating St. Mary's River. Copies will be sent free to any address.

#### REPORT OF FREIGHT AND PASSENGER TRAFFIC TO AND FROM LAKE SUPERIOR

FOR THE MONTH OF JUNE, 1896, INCLUDING STATISTICS OF THE UNITED STATES AND CANADIAN CANALS AT SAULT STE. MARIE, MICHIGAN, AND ONTARIO.

ITEMS.	June, 1896.			June, 1895			Total to July 1, 1896.			To July 1, 1895.
	U. S. Canal.	Canadian Canal.	Total.	U. S. Canal.	Canadian Canal.	Total.	U. S. Canal.	Canadian Canal.	Total.	
Copper, net tons	11,737	4,449	16,186	17,288		17,288	35,914	5,357	41,271	36,180
Grain, other than wheat, bushels	1,785,035	1,371,068	3,156,103				5,157,096	2,274,105	7,431,201	
Building stone, net tons	1,983	1,140	3,123	5,868		5,868	3,890	1,140	5,030	8,773
Flour, barrels	673,306	248,343	921,649	1,216,472	Not open to navigation.	1,216,472	1,519,319	432,246	1,941,565	2,682,225
Iron ore, net tons	906,080	682,339	1,588,419	1,489,573		1,489,573	1,907,946	1,023,757	2,931,703	2,540,702
Iron, pig, net tons	1,948	2,560	4,508	473		473	2,891	4,700	7,591	7,456
Lumber, M. ft. B. M.	109,136	7,900	117,036	136,286		136,286	218,914	8,938	227,852	223,937
Silver ore, net tons										
Wheat, bushels	2,344,687	2,476,544	4,821,231	1,584,571		1,584,571	13,606,609	5,494,576	19,101,185	6,246,961
Unclassified freight, net tons	25,839	13,312	39,151	30,287		30,287	40,838	15,423	56,261	42,131
Passengers	1,629	1,065	2,694	2,480		2,480	2,264	1,483	3,747	3,434
WEST BOUND.										
Coal (hard), net tons	39,769	32,259	72,028	33,166		33,166	91,522	44,669	136,191	81,304
Coal (soft), net tons	265,982	155,930	421,912	185,719		185,719	609,202	222,201	831,403	229,757
Flour, barrels				8,000	Not open to navigation.	8,000	1,109		1,109	150
Grain, bushels				9,311		9,311	26,468	9	26,477	18,250
Manufactured iron, net tons	11,574	9	11,583	30,888		30,888	81,364	1,401	82,765	20,439
Salt, barrels	47,552	1,401	48,953	38,365		38,365	84,217	20,197	104,414	90,350
Unclassified freight, net tons	32,883	11,793	44,676	2,134		2,134	1,844	1,700	3,544	83,742
Passengers	1,165	1,449	2,614							3,066
East bound freight, net tons			2,129,990						4,318,265	
West bound freight, net tons			560,597						1,149,157	
Total			2,690,587						5,467,422	

NOTE.—United States craft passing in June, 2,144; Canadian craft, 1,066; total craft, 3,210; United States craft, registered tonnage, 1,899,380; Canadian craft, registered tonnage, 999,187; total registered tonnage, 2,898,567.



## IN THE ENGINE ROOM.

## WORK FOR THE NEXT NAVAL SECRETARY.

Next spring will be a good time for some needed reforms to be started in the navy. Legislation is now having a tendency to improve matters, but a new Secretary of the Navy will find much to do when he takes his seat at the department, and it might be just as well to begin right. The controversy between the line and staff has reached a stage when it is seriously affecting the interests of the service, and a supreme authority who shall not be influenced unduly by either party is what is needed to set matters right. It will behoove the next President to choose some one for this important post who will not have to acquire all his ideas on the subject of naval affairs after his appointment, but one who has already had some experience, and is possessed of a few original views in naval ethics. All secretaries who have been appointed for many administrations past have been men of high standing in their chosen professions, but men who have had little practical knowledge of the duties of their office previous to entering upon them. There have been repeated charges made of late that there is what amounts to a conspiracy to prevent the engineer department receiving its share of recognition, and that there exists in the department a "machine" of line officers whose actions are extremely detrimental to the service. These repeated charges would seem to demand an investigation, solely for the reason that the interests involved are so extensive and so vital, even if the charges were not in many cases accompanied by statistics which show at a glance that something must be wrong. A letter written last April to Hon. Francis H. Wilson, one of the sponsors of the Wilson-Squire bill, by Mr. Asa M. Mattice, a naval engineer for a number of years, who resigned because of the disagreeable atmosphere thrown around his corps, has been recently printed and given general circulation. The charges contained in the letter are in themselves very definite, and invite the closest scrutiny; but the argument and statistical portion of this letter are of the most important character, and deal only with facts which, it would seem, can not be disputed. In this letter, which is entitled "Queer Doings in the Navy," he says:

"A glance at the navy register of January 1, 1896, shows that we have but 173 engineers in the navy—a smaller number than at any other time since 'before the war.' At the same time we have, in the line, or sailor branch, 714 officers, or 4.13 line officers to each engineer. 1864 there were 2,846 line officers and 1,728 engineers, regular and volunteer, or a ratio of only 1.64 to 1. Of this number there were in the regular service 464 line officers and 501 engineers. These numbers had been fixed by the necessities of war, and it is by reason of wars that navies exist.

"In 1866, just after the close of the war, there were in the regular service 395 line officers and 379 engineers, or practically equal numbers. Since that date the line has increased and the engineer corps diminished until we find over 80 per cent more line officers and the engineers decreased by 55 per cent. The English navy list has 1,730 line officers and 795 engineers, or nearly twice the proportionate number that we have.

"A glance at the United States Navy Registers of 1864 and 1896 will show facts even more startling; for instance, take the following ships of various classes:

Year.	Ship.	H. P.	Engineers.
1864	Steam Frigate Minnesota.....	1,000	9
1864	" " Wabash .....	950	8
1864	Steam Sloop Shenandoah.....	771	7
1864	Ironclad Roanoke.....	997	8
1864	Monitor Lehigh.....	340	5
1864	" " Nantucket.....	340	5
1896	Armored Cruiser New York ..	17,000	5
1896	Protected Cruiser Columbia..	18,500	4
1896	Barbette Cruiser Monterey....	5,244	2
1896	Cruiser Boston.....	4,030	2
1896	Cruiser Morblehead.....	5,451	3
1896	Wooden Cruiser Marion.....	753	1

"In 1868 there were 268 steamers and 77 sailing vessels in commission; yet with 20 per cent of the vessels without engineers, there were only 1.64 line officers to each engineer; while to-day, without a sailing ship in commission, with many ships without a rag of canvas, we have 4.13 line officers to each engineer. Moreover, in 1864 there was not a compound engine afloat; we have now passed through the era of the compound engine,

and are at the age of triple and quadruple expansion. In 1864 there was not a boiler in the navy that carried over 40 pounds pressure; they now carry 160 pounds and over. In 1864 there was not a ship that had her machinery in separate compartments, but all was under the eye of the engineer in charge; now there are few ships with fewer than four water-tight machinery compartments. In 1864 twin screws were unknown, except for a few light draft monitors; now twin screws are the rule, and the rule is seldom broken, except by triple screws. In 1864 few ships had any engines other than the main propelling engine and a couple of donkey pumps; the Columbia has no fewer than 90 separate engines, having 172 steam cylinders, and other vessels have machinery in proportion. I have rated the Marion among the ships of 1896, merely because she is almost a counterpart of the Shenandoah of 1864, yet she has but one engineer to the Shenandoah's seven."

The remainder of the letter is devoted to the methods by which the above changes were brought about, and contains a number of specific charges which the next Secretary of the Navy may do well to read before he enters upon the duties of his office. These remarks are not intended as a reflection upon the present secretary, who has taken some steps, but whose term of office is too near a close to warrant him in attempting anything radical.

While on the subject it might be mentioned that the controversy between the line and staff has culminated in the filing of charges against Engineer-in-Chief George W. Melville, by Capt. Philip H. Cooper, the superintendent of the Naval Academy. These charges were received at the department some weeks ago from the Naval Academy, and have since been buried in the secretary's office, the secretary showing no disposition to give them consideration. It is understood that the charges are based upon the article written by the Engineer-in-Chief in the North American Review, entitled "The Engineer in Naval Warfare," in which he made some statements in regard to the engineer cadets at the academy. These were taken exception to by the superintendent with the result that he forwarded a letter to the department in regard to them. In it the engineer-in-chief said: "Annapolis is either unable or unwilling to train naval engineers, and if its work is brought into comparison with that of other institutions, the Naval Academy will be compelled to extend its engineering curriculum or show cause for its existence."

## PEAT IN IRON MANUFACTURE.

It transpires that a small but wealthy syndicate in the neighborhood of Glasgow are working out two separate ideas, the combination of which will, they believe, have a tendency to revolutionize the iron and steel trade of the British Isles, and give them the mastery of the steel trade of the world. The first is a scheme for systematic and rapid drying of peat, and the second is the application of this fuel, when converted into charcoal, to the smelting of ore. Peat charcoal is practically pure carbon, and by its use a pig iron is obtained which is malleable, ductile and tensile in the highest degree.

Thus, it is claimed, an advance has been made on the way to making steel direct from iron ores, without any intermediate process. It is further claimed that peat charcoal is more efficient and more economical to use in hardening armor plates than is the Harvey process. Certainly, the use of peat for this purpose will go far toward solving social economic problems in Great Britain and Ireland, especially the latter, in giving some value to the vast stretches of waste land and the quantities of low grade iron ore that abound there, even if no greater result is reached.

## NEWLY ENROLLED TONNAGE.

Following is a list of lake vessels to which official numbers and signal letters have been assigned by the Commissioner of Navigation, for three weeks ending June 27:

Official No.	Reg.	Name.	TONNAGE.		Where Built	Home Port
			Gross.	Net.		
107,277	St. s.	Alert	102.48	69.69	Buffalo	Buffalo
86,354	St. s.	Geo. D. Nau	74.77	50.85	Green Bay	Milwaukee
100,613	St. s.	Iowa	1,157.47	846.38	Manitowoc	Milwaukee
81,541	St. y.	Walter J.	9.88	6.72	Tonawanda	Sus. Bridge
127,140	St. s.	Columbia	26.20	17.82	Clayton	Cape Vine't
86,355	Sch. y.	G. W. H.	24.08	19.86	Chicago	Chicago
59,466	Bge	T. L. Nolan*	113.34	113.34	Delray	Detroit
107,229	St. s.	A. H. Green	79.76	54.24	Ben. Harbor	Chicago
107,228	St. s.	Aragon	1,450.09	1,072.28	Wyandotte	Cleveland
136,558	St. s.	Effie B.	51.03	11.56	Ashtabula	Cleveland
136,561	St. s.	Enquirer	140.36	95.45	Buffalo	Buffalo
116,723	St. s.	Sir H. Bes'mr	4,321.10	3,293.08	Cleveland	Duluth

\*Built in 1895.

## TRADE AND INDUSTRIAL NOTES.

The weight of a cubic inch of Tobin bronze is .3021 lbs., as against .3176 lbs. for copper, a considerable gain as regards lightness. When tested for tensile strength, two rolled Tobin bronze plates, one-quarter inch thick, and two plates three-sixteenths inch thick, averaged 79,145 lbs. per square inch, and the elastic limit of the plates averaged 53,787 lbs. per square inch, figures which compare most favorably with those usually given by mild steel. Six one-inch rolled rods of this bronze turned down to 5/8-inch diameter when tested, averaged 79,600 lbs. per square inch, the elastic limit of three of the rods being reached at 54,257 lbs. At a cherry red heat this bronze can be forged or stamped, either by hand or machinery, as readily as steel, or it can be drop-forged. When finished it has a bright golden color, and after exposing two samples for five months to the action of, respectively, saturated solutions of salt and caustic soda, they were found to be unchanged. A nine-tenths solution of sulphuric acid discolored the plate exposed to it, but in five months only caused the loss of .014 oz. out of the plate's original weight of 5.527 ounces. The address of the company is 21 Cliff street, New York.

The Institute for Home Study of Engineering, of Cleveland, is making important additions to its working staff. Prof. Arthur R. Curtis, professor of mechanical drawing and allied studies in the Colorado State School of Mines, is taking personal charge of the mechanical drawing course of this institute. Mr. Curtis graduated from the Case School of Applied Science, was one of the principal draughtsmen for the Morgan Engineering Works, of Alliance, O., and held other positions before going to the school of mines. He has been partially connected with this institute for several months.

The Bethlehem Iron Co., of South Bethlehem, Pa., announce that they are now ready to roll plates from high-grade, open hearth steel on their new plate mill, the rolls of which are 126 inches in length. Their product in this line will consist of plates for all purposes, which include ship plate, boiler plate, tank, stacks, etc.

The Director of Public Works, of Cleveland, has been authorized by the city council to advertise for proposals for building a wagon and foot-bridge on Seneca street over the tracks of the C. & P. and L. S. & M. S. railroads from Seneca street extension to Lake Erie, with the necessary foundations and approaches.

The Kilby Manufacturing Co., of Cleveland, has finished the first of ten disappearing gun carriages, for which it has a contract with the government. The gun is 31 feet long and over 3 feet thick at the breech. It throws a 575-pound projectile 7 miles with a 250-pound charge of powder.

Forty acres of the Oliver estate at Duquesne have been bought by the Carnegie Steel Co. for manufacturing purposes. The reported price is \$175,000. The site may be used for the gun forging plant which it is reported the Carnegie Co. is to build.

The Bethlehem Iron Co. has practically completed its slabbing mill and large plate mill at South Bethlehem, Pa. The new plate mills are housed in a building 1,000 feet long, which forms an extension of the open-hearth department.

The Crane Co., Chicago, are sending out two very attractive hangers of their patent metallic disc valve and their high-pressure gate valve. The gate valve hanger represents a valve of 24 inches, weighing 6,200 pounds.

## NO LIQUID FUEL.

Engineer-in-Chief Melville, after exhaustive experiments, concludes that liquid fuel is useless for warships. Petroleum does not give as good results as ordinary coal, and in consequence it can be stated positively that this kind of fuel will not be used for spurring purposes in vessels of the U. S. Navy, unless it be in the proposed torpedo boat destroyers, and even not then if the Engineer-in-Chief had his way. Reports received from the naval attaches of the United States abroad show that the European nations are abandoning the use of liquid fuel on board men-of-war. The English government is constructing a cruiser so fitted as to burn liquid fuel but there is talk in English naval circles, according to the department's advices, that she may after all be converted into a coal burner. For the same square foot of grate surface, it has been estimated at the department that coal is greatly the superior of liquid fuel.



## NEW INVENTIONS.

Mr. Horace See, No. 1 Broadway, New York, has obtained three patents recently. One of these is for a water-tube boiler. The tubes are arranged in two sets, one on each side of the furnace, and extend from the base boxes to the steam chambers, which connect with steam drums. The hot gases of combustion from the grate pass across and between the two sets of water tubes around the steam drum into a double flue which has two dampers. The boiler is so arranged that if necessary one-half can be operated while the other is being laid off for repairs.

The second of his patents is on a system of "Construction of Roadway for Vessels," (No. 563,074). The claim is for the combination, in a floating structure, of metal supporting-beams A; bulkheads thereon; hollow metal coamings, each consisting of a vertical plate C, a flanged upper plate F, and a back plate G, and open on their under side, and projecting inwardly between said bulkheads; plates J, resting on said beams; means for rigidly connecting the outermost plates J to said coaming plates C; a metal flooring beneath said coaming. Within this trough-like structure is a pavement of asphalt, concrete, or equivalent material, extending from coaming to coaming.

Mr. See's third patent (No. 563,075) is on a system of ferry-boat construction. The claim is as follows:

1. The combination in the hull of a vessel of supporting beams, metal plates thereon, retaining walls or bars O, intermediate partitions, a body of asphalt, concrete, or equivalent material resting on said plates and filling the spaces between said walls and partitions, and a layer of tiles above said asphalt and said partitions, and extending between said walls.

2. The combination, in the hull of a vessel, of deck-beams B and supporting brackets therefor within said hull, guard-beams E extending athwartship beyond said hull, brackets G and struts H supporting said beams E, metal plates N resting on said beams B and E, and a flooring of non-metallic fire-proof material on said plates N.

Mr. Frank A. Mershon, of Sparrow's Point, Md., has obtained a patent (No. 563,048) on a system of construction of boats whereby the hull or body of a vessel is provided with the curved lines of an ordinary vessel without the necessity of the employment of bent work. The vessel comprises a keel and keelson, an upper carline curved inwardly and downwardly, a bilge-carline also curved outwardly and curved downwardly to a greater degree than the upper carline, an upper series of flat, unbent transverse panels lapped upon and secured to the upper carline and the bilge-carline, and a lower series of flat, unbent transverse panels secured to the bilge-carline and the keelson, the panels of the lower series breaking joints with those of the upper series.

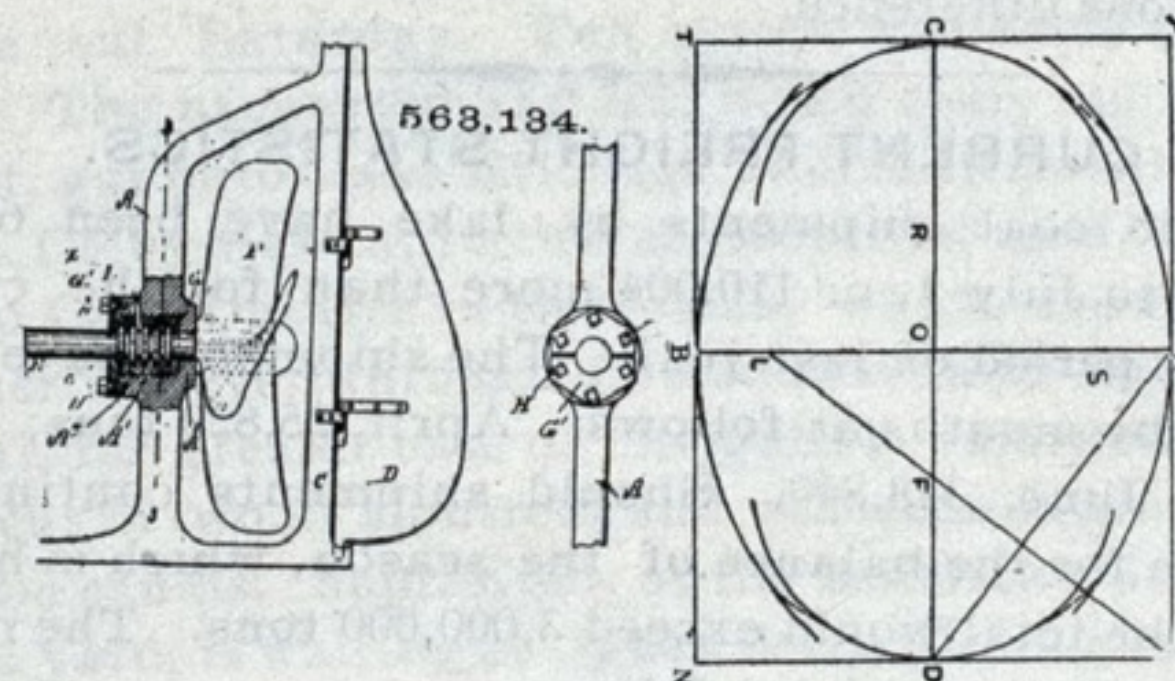
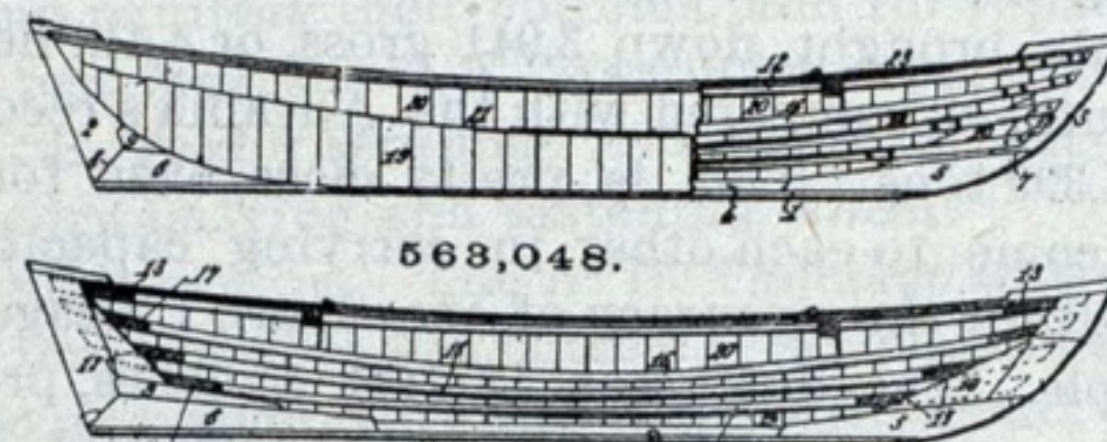
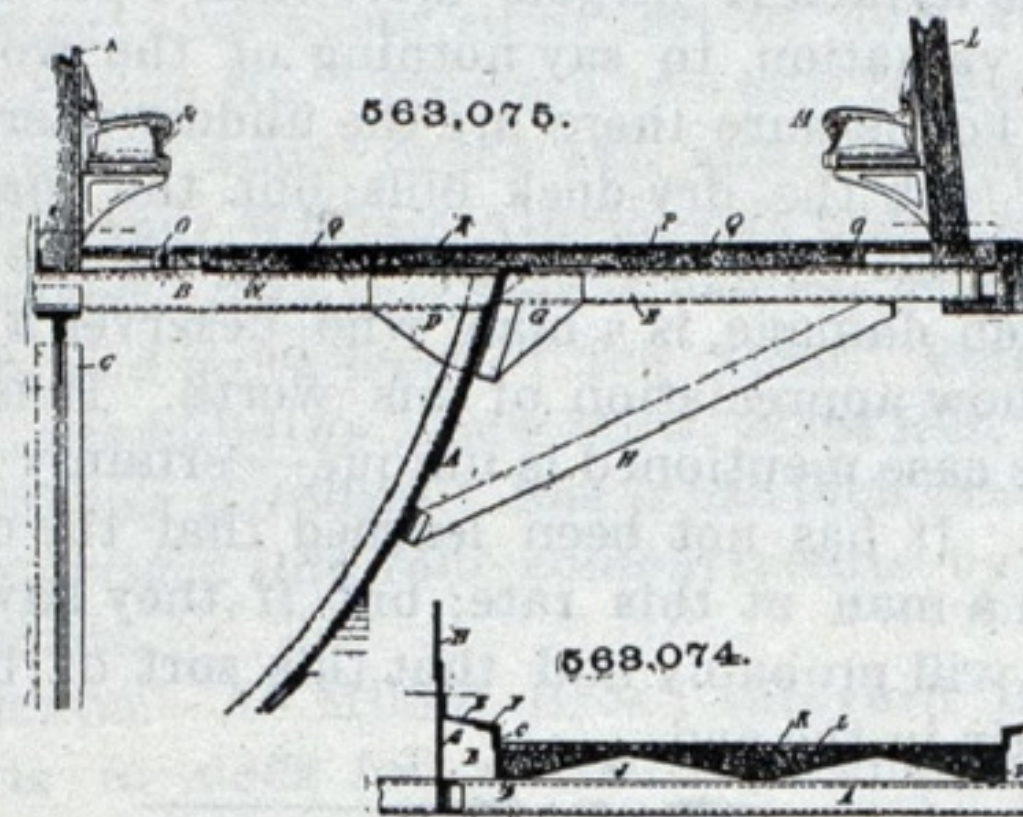
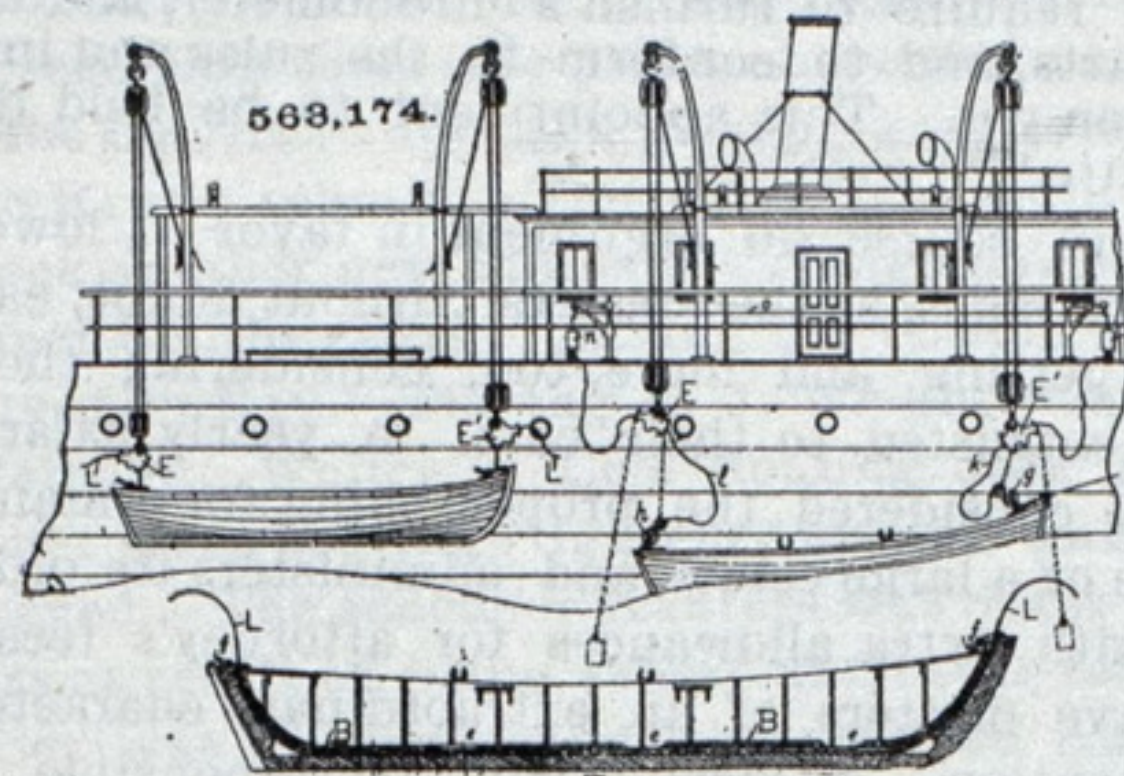
A new propeller shaft bearing has been invented by William M. Campbell, of Chelsea, Mass. (Patent No. 563,134). The claim is for the combination, with the sternpost A, of a vessel having an enlarged, internally-threaded socketed hub with a shoulder at the rear end of said socket and a contracted opening arranged centrally of the socketed hub and extending entirely through the latter, of a two-part shaft-bearing externally screw-threaded to fit the threaded socketed hub, longitudinal ribs or projections on one of said bearings which fit in corresponding grooves or recesses in the abutting bearing, said bearing being also provided on its interior with alternate annular grooves and projections and transverse orifices arranged through the projections of the lower part of the bearing for the passage of a lubricant, bolts passed through the flanged parts of said bearings and entering the hub, the propeller shaft passing through said bearing and contracted opening in the hub and provided with alternate annular grooves and projections to engage the corresponding grooves and projections of the bearings, and a propeller mounted upon the end of said shaft.

Patent No. 563,174 covers a boat-detaching and recovering apparatus, invented by Edgar C. Hillyer, of Newport News, Va. It consists of a suspending rope or cable, and a protecting tube disposed endwise of the small boat, through which the rope passes freely, being secured at each end by a releasable davit clamp, and means for positively releasing either clamp when the rope is under strain; also of automatic take-ups for the suspending rope. The clamp comprises a casing or

main body portion having a swinging jaw mounted therein, a co-operative sliding jaw, stepped at its under end, and means for releasing the sliding jaw.

## LAYING OUT A GASKET FOR A MANHOLE.

Manholes are generally elliptical in shape and vary from 15 x 12 to 13 x 11 inches. Determine the dimensions of the gasket from the manhole. Then take a piece of stiff cardboard of sufficient size and proceed as in the figure. Draw AB equal to the smaller dimension, and find O, the midpoint of AB. Draw COD perpendicular to AB and make CO = OD, and CD equal to the larger dimension. Then complete the rectangle PENT. Draw AD, and from E drop a perpendicular to AD, cutting AB at L and CO at F. Set your dividers to the



length FD and describe an arc about F. Take CR equal to FD and describe another arc. Now set your dividers to LA and describe an arc about O as a center. Then take BS equal to AL, and describe an arc about S as a center. This will give you nearly all of the ellipse and will leave only the dotted lines to be drawn by hand. Proceed in the same way to find the outer ellipse (not shown in the figure) and then cut the figure out with a sharp knife and use it for a template. When cutting the rubber for the gasket have the knife wet.—Power.

## A RECORD ON BOILER BUILDING.

The facilities of the Roberts Safety Water Tube Boiler Co. have been so greatly enlarged that they have just completed a 150 h. p. Roberts boiler for the steam yacht Sultana, on an order from the Erie Basin Dry Dock Co., in eight working days from the time they received the order. This boiler is built in their best style, the material has all been inspected, and the boiler will pass inspection for 250 pounds of steam. Two weeks' time was allowed by the contract, but the owner was very anxious to have his yacht in commission on July 4th, and the Roberts Boiler Co. decided that they would beat the record on boiler building, and have undoubtedly done so. Notwithstanding the lateness of the season, they are running full time and have been working nights and Sundays lately.

## BUILDING OF RACING SHELLS.

Among the many interesting industries coming under the scope of naval architecture none deserves more attention and is less known or recognized than the building of racing shells and riggings. From a crude art it has developed into a science, inviting the attention of the physician, the physiologist, and the enlightened coach.

The very fact that shell rowing is given the greatest prominence in sports among European and American universities, and is practically the only sport kept up by graduates in after life, especially in England, goes to prove the esteem in which this noble exercise is held. But while the art of shell rowing extends the world over, the science of it remains for the general public as well as for the oarsmen themselves, a dark mystery. Several reasons account for this. Englishmen have been for centuries the recognized leaders par excellence in all kinds of maritime sports among Europeans. They have had the brawn and the brain and developed the art of rowing up to a certain standard, closely followed by their Continental competitors. Working with equal weapons they were only occasionally beaten by superior brawn, never by brain, as their opponents clung as religiously as they did themselves, to existing methods and apparatus.

Our American colleges, especially the leading ones, have been pronounced Anglophiles for decades back, and we find them ingloriously aping where they should lead. The question naturally asked is, could they lead, and in reply let us only refer to our professional oarsmen, who at all times have been successful in international contests and redeemed the recurring defeats of our amateurs. Our professionals cannot afford to be Anglophiles; they go into rowing for their living, and recognizing the fact that physical superiority may be on the other side, they look to advantages which may be derived from mechanical devices. The idea patent with our university coaches that a thing must be good because it is used in England, had no bearing with our professionals. To them we owe, for instance, the introduction of the swivel rowlock now used by all professionals on both sides, and by all colleges and clubs on this side, while Oxford and Cambridge and others in England still cling to the old-time thole-pins, a fact which prompted the coach at Harvard only this spring to recommend their readoption there! Thanks to the opposition, preventing such a retrogression to be committed. There is no disguising the fact that physically the Englishmen have a better pick among their gentlemen amateurs than we have. The clubs competing at Henley have among their participants men who are graduate college men and who have kept up the exercise for years since, while our college boys are comparatively green men, some in their first season and always more or less affected by the change of climate. Where seconds count, the odds are against them even with superior mechanical devices. Still, admitting the physical disadvantages and noticing the great race Cornell rowed last year, there must be considerable merit in these devices to make them row as they did. And yet prominent coaches will make themselves notorious by advocating a return to antiquated English devices and give as the only reason that the Englishmen do so.

But if such is the advice of coaches what can be expected of the crew? If their manhood asserts itself and they are audacious enough to question the incongruities of their coaches, they are simply put out of the boat; they must be nothing but mere machines and are only expected to execute mechanically, motions as they are told, by all men in unison—no individuality—just like galley slaves, and the press will commend, will laud their fine appearance, the Cook, the English, the Yale, etc., stroke and will make the crew proud to exist.

And if by chance or otherwise such a crew wins, from among them will arise one or more candidates to coachship as those in power have risen. Now nothing to the initiated is more ridiculous and senseless than the talk about this or that stroke, which only has the purpose of drawing the attention of the public to the pretention of the coaches in order to sustain them in their methods and positions. In dwelling on these methods and the physical deportment of the crew, the general public is so blinded as to lose sight of mechanical matters vastly

(CONTINUED ON PAGE 10.)





(ESTABLISHED 1878.)

PUBLISHED EVERY THURSDAY BY

THE MARINE RECORD PUBLISHING CO.,

[INCORPORATED.]

GEORGE L. SMITH, President.

C. E. RUSKIN, . . . . . MANAGER.  
W. L. McCORMICK, . . . . . EDITOR.  
THOMAS WILLIAMS, Chicago, . . . . . ASSOCIATE.

CLEVELAND,  
WESTERN RESERVE BUILDING,  
FOURTH FLOOR.

CHICAGO,  
ROYAL INSURANCE BUILDING,  
ROOM 308.

## SUBSCRIPTION.

One copy, one year, postage paid, . . . \$2.00.  
One copy, one year, to foreign countries, . . \$3.00.  
Invariably in advance.

## ADVERTISING.

Rates given on application.

All communications should be addressed to the Cleveland office.

THE MARINE RECORD PUBLISHING CO.,  
FOURTH FLOOR, WESTERN RESERVE BUILDING,  
CLEVELAND.

Entered at Cleveland Postoffice as Second-Class Mail Matter.

CLEVELAND, O., JULY 9, 1896.

It is again hinted that Chief of Engineers Craighill will shift the United States engineers around somewhat as soon as the recommendations made for fortifications and river and harbor improvements are sent in. Whether these recommendations will be passed upon as evidence of the degree of ability possessed by each is not stated. It is thought that very few changes will be made, however, which will affect the lake districts.

WHILE the loud complaint about the abuses of private lights which have been perpetrated by rafts this season is all well founded, it is pleasant to be able to record that some of the timber people are exercising some care in this direction. Alger & Smith are towing their large rafts in integral form only as far as Port Huron. There the rafts are divided into sections and brought through the river by smaller tugs. This is a graceful and only reasonable concession to the just demands of the vessel interests; but all the same, Gen. Alger and his business associates desire credit for inaugurating a reform.

AN English nautical expert pronounces absurd the opinion expressed by some British journals, that the steamship Drummond Castle met with her fate by leaping one of the huge rocks of Ushant, thereby damaging her entire bottom. This was the view held by the Liverpool Journal of Commerce, as stated in THE RECORD last week. This expert, writing to Fairplay, states that the ship was undoubtedly carried out of her course by a current which sets in-shore at the rate of about four miles per hour, and that she then headed eastward, her master supposing that he had passed the light without seeing it, and that the ship was headed up the English Channel. He says this was evident from her maneuvers as seen from the steamship Werfa, which was not far off. The writer then makes the observation first mentioned above, as follows:

"Granting that such was the cause of the loss, it is still most unsatisfactory to find that ships of such a class can be so built (and this is largely the fault of our tonnage law) as to admit water sufficient to sink them immediately on the grazing of the edge of a rock. Some ignorant persons have supposed that the ship leaped a reef, which is nonsense. What she did was to graze a reef, probably on the turn of the bilge, and thus to rip the outer skin for a considerable distance, so destroying any good effect to be hoped for from athwartship compartments. Had she had what is now at last generally advocated, a cellular bottom, of which no cell could hold more than ten tons of water, we might have hoped for a better result, or at least such delay as would enable the passengers and crew to escape in the boats."

## BIG MONEY FOR MASTERS.

Several owners on the lakes have been criticized for offering low salaries to masters of modern 3,000-ton steamers, and the masters who accepted these salaries have also been the subject of some contemptuous comment. The amount of pay referred to was from \$1,100 to \$1,300 per season, which for a lake master means probably ten months of the year. In comparison with this it may be noted that £10 (\$50) per month, without perquisites, was the salary recently offered by an English firm to a captain to take command of a ship of nearly 3,000 tons under the following restrictions:

"This is in full of all commissions, discounts and perquisites, of whatsoever nature or kind. No cash to be drawn at any port for your own private use to exceed £10 sterling. All accounts to be settled at head office. You will require to furnish a chronometer, and all the usual charts, and to conform to the rules and instructions given you. This appointment to be held during our pleasure."

This is, of course, no argument in favor of lower salaries on the lakes, as the masters without doubt, earn all they are getting, and more, too, considering the vast property entrusted to their care. A yearly salary of 2 per cent is considered the proper thing for a man who takes care of a large estate and administers its ordinary affairs, with extra allowances for attorney's fees, etc., when grave matters of an extraordinary character demand attention. A master who is responsible for a great vessel is in luck if he gets more than 1 per cent of the vessel's valuation, to say nothing of the worth of any cargo. To be sure there are the underwriters, who so gracefully foot the dry-dock bills; but the man who keeps his boat out of trouble and obviates all the delay caused by such damage, is a man who deserves a salary which will show appreciation of his worth. It is probable that the case mentioned is unique—certainly it is to be hoped so. It has not been learned that the owners have secured a man at this rate; but if they have succeeded, they will probably find that this sort of help is the most costly in the end.

THE big schooner George E. Hartnell, a sister ship of the Aurania, brought down 3,941 gross, or 4,414 net tons, from Duluth, as compared with the Aurania's records of 3,928 or 4,399 tons. This is pretty close, even for sister ships to come to each other in carrying capacity, and speaks well for the accuracy of the South Chicago shipyard people. The draft was 14 feet 4 inches, probably varying the small fraction necessary to account for the fifteen tons difference.

## CURRENT FREIGHT STATISTICS.

Buffalo coal shipments by lake have been 644,173 tons up to July 1, or 110,004 more than for the corresponding period of last year. The shipments have been divided by months as follows: April, 25,820 tons; May, 269,514; June, 348,849. Should shipments continue at this rate for the balance of the season, which is hardly likely, the total would exceed 3,000,000 tons. The record for five years past is as follows:

Year.	Tons.	Year.	Tons.
1891.....	2,865,895	1894.....	2,485,255
1892.....	2,852,330	1895.....	2,620,760
1893.....	2,708,678		

Ashtabula received 508,403 long tons of ore in June, and shipped 141,357 net tons of coal.

Cleveland's June ore receipts were 505,403 tons and coal shipments 133,075, according to custom house reports.

Conneaut received 65,369 tons of ore in June and shipped 21,520 tons of coal.

Fairport's ore receipts were 25,210 tons, and coal shipments 33,700 for June.

Lorain received during June 35,287 tons of ore and shipped 31,383 tons of coal.

Ore shipments during June from Duluth and Two Harbors were 711,432 tons, which beats August, 1895, the previous banner month, by 87,310 tons. The total shipments of all commodities from the two ports were 632,867 tons against 553,092 tons in June, 1895. The total receipts were 159,871 tons, as compared with 101,012 tons last year in June.

Gladstone shipments for the week ending July 4 were: Ore, 4,900 tons; grain, 195,000 bu.; lumber, 1,300,000 feet; flour, 6,000 barrels; cedar, 25,000 pieces.

THE MARINE RECORD Directory of Lake Masters and Engineers for 1896, is one of the most complete of the

many similar lists published by this sterling weekly periodical for mariners at Cleveland. The book is convenient in form, and is sold for 25 cents a copy.—Sault News.

## WRECKS AND WRECKING.

The ever unlucky steamer S. J. Hodge has been added to the list of total losses. The Hodge, bound from Cleveland to Prescott, Ont., with 600 tons of wire, caught fire about 3 a. m. Sunday on Lake Ontario, off Oak Orchard. The flames spread rapidly, and those on board escaped with little else but their lives. They took to the boats and were picked up by the steamer St. Joseph, Capt. John Preston, who took them to Oswego. A man named Deeley, who shipped as fireman at Buffalo, perished in the flames. The Hodge is owned by Farrell Bros., of Buffalo, and was insured for \$18,000, being valued at \$25,000 and rated A2. The Hodge was built in 1881. Capt. John Perew, representing Smith, Davis & Co., of Buffalo, has gone to the locality where the steamer sank, and will try to get some of her wire cargo if possible.

The steamers Runnells and Preston collided one night late last week at Southeast Bend, St. Clair Flat. Both continued their trips, but it is said both will have to be docked.

The schooner J. R. Pelton, loaded with stone from the Islands for Cleveland, went ashore about two miles east of Lorain in the blow about 4 o'clock Tuesday morning. The schooner Brenton, out in the same blow, had some of her canvas torn up off Rocky River. She was loaded with gravel, and made some water. She was assisted into port by the Cleveland life saving crew.

The schooner Thomas L. Parker, while discharging ore at Conneaut last Thursday, was hit in the stern and damaged \$200 by the John Oades. The Parker, four days later, collided with the schooner Marsh, anchored below the rapids at the Sault. The Marsh lost her jib-boom, but the Parker was not damaged.

The damage to the Brazil, from striking Ballard's Reef on Wednesday of last week, consisted of a 2x5 foot hole in her bottom. Her inner bottom was not harmed and the Brazil proceeded.

Capt. James Reid hopes to have the Cayuga ready for lifting before August 1. One cable has been placed under the hull near the bow, and five others will be passed under. The four steel pontoons will be sunk beside the hull. They have an estimated lifting power of 500 tons, and a scow, capable of lifting 1000 tons, has been attached to the lines. The 35,000 bushels of oats in the hold has been pumped out, and it has been found that several compartments in the water bottom are intact. The cables are being passed under by the sweeping process, which is rather tedious, and practicable only in good weather.

The Leatham & Smith Towing and Wrecking Co. have sent an expedition to release the schooner Mattie C. Bell, which went ashore on Summer Island, Green Bay, last fall, in company with the Jim Sheriffs, which was lately released.

Capt. J. V. Tuttle disposed of the copper recovered from the jettisoned portion of the Centurion's cargo, which was thrown overboard at Isle Royale, for \$120,945, leaving a shortage for the underwriters to stand of about \$38.35. He thinks the divers did their work thoroughly, but says there was probably a mistake made when that part first recovered was delivered at Duluth. Captain Inman has been paid his 10 per cent for salvage, \$12,900.

John Stang is recovering the pig iron cargo of the lost steamship Transfer, off Lorain. The cargo was dumped out, and lies on the bottom. Mr. Stang sunk a scow last Thursday while at work there.

The damage to the soaked lumber cargo of the steamer Colwell is assessed at \$2,700.

## NOTES.

U. S. Engineer H. Von Schon and party are completing the survey of St. Mary's River, working in the neighborhood of Detour. U. S. Engineer Thomas Russell and party have just completed their triangulation work in Whitefish Bay.

The steamer Queen City took her first cargo Wednesday—154,000 bushels of wheat from Duluth, besides 100 tons of fuel, on draft of 14 feet 4 inches. This breaks the record for grain carrying from Lake Superior, and is equivalent to 5,133 net tons.

The banner cargo carried by the W. D. Rees was loaded at Two Harbors, consisting of 3,928 gross or 4,399 net tons. This is a record breaker for steamers on Lake Superior and eclipses her former record of 3,857 gross or 4,331 net tons.



## SHIP BUILDING AND REPAIRS.

## DULL FREIGHTS MAKE BUSINESS DULL.

Vessel men are just as susceptible as ever to the pessimisms caused by the low freights and general lack of confidence, and even those owners who contemplate adding to their fleets during the coming winter are not disposed just now to do any figuring with builders. The only talk of new work comes from the coast, where several private orders have been placed lately and where there is general expectation on account of the contracts for several battleships and torpedo boats, and two revenue steamers which will be awarded by the United States Government within a few months. The lake builders are once again shut out of bidding on the torpedo boats because the administration insists on adhering strictly to the letter of the treaty of Washington, while both governments are violating its spirit in the construction of revenue cutters. Lake builders can, of course, bid on the latter, as both are intended for the Great Lakes; but government work is unpopular at the best, and if any company sees indications that it will be able to fill its yard on private contracts, these will be given the preference to the revenue boats. The only new lake work mentionable is the contemplated order by Zorhurst and others, of Sandusky, for a new steam barge.

The ship builders are rapidly clearing their yards of the fleet of 1896, save those which were not expected to be out until autumn. The South Chicago Ship Building Co. is about to begin work on the steamer Crescent City, for the Zenith Transporting Co., of Duluth, which the builders contracted to have ready by the opening of navigation, 1897. The steamer Queen City, built at the Cleveland Ship Building Co.'s yard, was delivered late last week and has just left Duluth with a record-breaking cargo.

The Sir Henry Bessemer, the first of the fleet of twelve new ships for the Bessemer Steamship Co. John D. Rockefeller and others, was delivered to her owners Wednesday by the Globe Iron Work Co., and left early this morning for Duluth. It is hoped that the new ship will enjoy the long life and activity of her illustrious namesake, who is now in his 84th year, and is a paragon of industry. Just fifty years have elapsed since the young man emerged from the obscurity of the workshop in St. Pancras, London, and read before the British leaders in the iron industry his paper "On the Manufacture of Malleable Iron and Steel Without Fuel."

Wheeler & Co., of West Bay City, expected to launch one of the Bessemer steamers next Saturday, but this will probably be interfered with by a strike of about 600 of their employes, who are trying to force the company to discharge a non-union employe. The company has announced that it will endeavor to manage its own business without assistance from the men, and is moving along at a somewhat slower pace than usual.

The American Steel Barge Co., has postponed the launch of the John Ericsson until next Saturday. Her boilers have been placed in her. Her consort will be launched about the 21st.

## LAUNCH OF THE MARICOPA—NEW TUG.

Special Correspondence to The Marine Record.

OFFICE OF THE MARINE RECORD, }  
CHICAGO, July 8. }

Another very successful launch took place at the Chicago Ship Building Co.'s yard at South Chicago last Thursday afternoon, under the direction of Manager W. I. Babcock, when the new steel steamer Maricopa took her first plunge into her native element. Miss Ethel Burnham, daughter of D. H. Burnham, did the honors of christening. The new steamer is the largest ever launched on Lake Michigan. Her dimensions are 406 feet keel, 48 feet beam, 28 feet moulded depth. Her engine is triple-expansion, with cylinders 25, 40 and 68 by 42 inches. She has 3 boilers 13 by 13 feet each.

The new tug Andrew H. Green, recently built for the Green Dredging Co., Chicago, by E. W. Heath, at Benton Harbor, Mich., arrived here last week. She is 85 feet long over all by 20 feet beam, 11 feet moulded depth; engine, fore-and-aft compound, 16 and 34 by 26 inches; boiler, 9½ by 12 feet, allowed 130 pounds steam pressure. She is also supplied with a Buffalo forced draught and a Queen City hydraulic steering gear. She is one of

the best built and equipped tug boats on the lakes, and cost \$17,000. Capt. William Murphy is master, and Joseph Stubbs is engineer.

Johnston Bros., boiler makers, Ferrysburg and Chicago, have closed a contract with the Lake Michigan Car Ferry Co. to build two marine fire box boilers 9 feet deep by 14 feet long, each to be allowed 130 pounds steam pressure, for the steamer J. C. Perrett, which tows the company's car ferries.

## GENERAL REPAIR WORK.

CLEVELAND.—The rebuild of the Swain is progressing steadily at the Ship Owners' dry-dock. She is now in the dock, while steel keelsons are being put in. The tugs Maytham and Chris Grover and schooners Plymouth and Three Brothers have been docked during the week to have leaks stopped. The Sitka is lying at the dock, receiving some new plank above the water line.

At the Cleveland dry-dock good progress is being made on the Kent's rebuild. The Olive Jeannette is out of the dock and her new cabins are going up rapidly. The schooner Southwest is in having her bottom calked.

STURGEON BAY.—The tug A. J. Wright was placed on the Reiboldt, Wolter & Co's floating dock June 26 to have her stern bearings tightened and her wheel patched and keyed. The schooner Kanfers was in for ten days' repairs as result of being ashore at Gravel Island. Her forefoot was renewed, and she received considerable new planking, frames and ceiling amidships, besides recalking; also about eight feet of new keel. Government Dredge No. 1 received two new corner braces forward, a new spud brace aft, and stopped some leaks. The schooner William Aldrich has been having her bottom calked. The tug Nelson had her stern bearings repaired, and got a piece of new stem. Reiboldt, Wolter & Co., are building a new scow, 28x60 feet, to be used for pile-driving purposes. She is 6x8 inch pine, edgebolted, and is divided into four compartments by longitudinal bulkheads.

CHICAGO.—At Miller Bros' shipyard the Edwin S. Tice is in dock for a new stem and new crank pin. The steam yachts Buena and Olie were in dock for cleaning and painting their bottoms, and for repairs to their stern bearings; the S. K. Martin for repairs to her wheel; the A. B. Taylor scraping and painting her bottom, a new stern bearing and fastening wheel.

WEST SUPERIOR.—The A. D. Thomson was docked last week for repairs to her bottom. Six plates had to be removed and several frames straightened out. The W. D. Rees, which also struck bottom at the Sault, is expected to be out Saturday. Ten plates had to be taken off her. The barges 201 and 202, which came up from the coast, got onto Lake Erie last Thursday morning. The J. L. Colby was cut in two at Montreal and is coming up to Lake Ontario in two parts, which are lashed together, however, through Coteau lakes and the Cornwall canal, for greater ease of navigation. Barge 110 is being cut in two at Montreal and will soon begin her trip up the canals. Supt. Kidd, of the American Steel Barge Co.'s yard, is waiting at Ogdensburg with a gang of men ready to put the two parts together again. The 201 and 202 are coming hither in tow of the steamer Frank Rockefeller.

DETROIT.—The repairs here consist chiefly of machinery work just now. The engines of the Merida were assembled a few days ago and the work of setting up has begun. The Frontier Iron Works has been very busy on small marine repair work, having a good many castings to make. They have just sent a new wheel to the Uganda, which will have it put on at Port Huron.

STURGEON BAY.—The tug A. J. Wright was placed on the Reiboldt, Wolter & Co's floating dock Friday to

have her stern-bearings tightened and her wheel patched and keyed. The schooner Kanfers is in for ten days' repairs as result of being ashore at Gravel Island. Her forefoot must be renewed, and she will have considerable new planking, frames and ceiling amidships, beside recalking. Government Dredge No. 1 received two new corner braces forward, a new spud brace aft, and stopped some leaks.

## REPAIR NOTES.

The tug Fabian has been having her sternbearings tightened at Buffalo, and the tug Conneaut has had her shaft straightened.

J. W. Squires of Marine City, is said to have paid the underwriters over \$4,000 for the wreck of the Jim Sheriffs. He has had her docked at Milwaukee.

McNally & Davis' dredge has been getting a new boiler and a general overhauling at Toledo.

The steamer W. R. Burt has been getting some hull repairs at Monk's dock, Sandusky.

## THE FREIGHT SITUATION.

The Lake Superior ore rate has gone off to 60c, and still there are not enough cargoes to supply the demand. Line boats are asking for small jags of ore to put in their holds, as flour shipments have fallen off. All this is due to the general dullness in the business world, which has shut down mills and furnaces, and cut off the demand for ore. The furnaces in this territory have been further oppressed by the freight rates, which are too high to allow them to compete with Southern furnaces outside this immediate territory. Efforts to secure a 40c reduction in the Cleveland-Chicago and Cleveland-New York rates have so far been refused, although the freight men in this territory see the necessity of it. Marquette remains at 55c and Escanaba at 45c.

Coal is moving freely from both Ohio and Buffalo. Hard coal rates are 25c to Duluth, 35c to Milwaukee, and 40c to Chicago. Soft coal pays 30c to Duluth and 35c to Milwaukee.

The Duluth-Buffalo wheat rate has dropped off to 1½c and the Chicago-Buffalo corn rate holds at 1½c.

## POSTOFFICE NEEDED AT COPPER HARBOR.

There is an effort being made by vessel men and others interested to secure the establishment of a post-office at Copper Harbor, Lake Superior, and the institution of a mail service thereto. Those living in that region, including the lightkeepers, have to go from fifteen to thirty miles for their mail. The establishment of such an office there would also be a great convenience to the vessels.

Samuel Plimsoll, the British sailor's friend, is now on a visit to the United States. The venerable originator of the Plimsoll load line mark, which has to be painted on the sides of every British ship, is nearly seventy years of age. He came across the Atlantic this time for the benefit of his health.

Secretary Lockwood, of the Sandusky Yacht Club, offers \$25 reward for the body of Charles F. Schuck, washed overboard from the yacht Shamrock, four miles east of Cedar Point, July 4. He was 5 feet 11 inches in height, and weighed 165 pounds. Had black, wavy hair, light mustache, high forehead, front tooth filled with gold.

## QUARTERLY SHIPBUILDING RETURNS.

The following table shows the number and tonnage of sailing and steam vessels built in the United States and officially numbered, as shown by the records of the Bureau of Navigation, Hon. Eugene T. Chamberlain, commissioner, during the quarter ended June 30, 1896:

	WOOD.				IRON.		STEEL.			
	SAIL.		STEAM.		STEAM.		SAIL.		STEAM.	
	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.
Atlantic and Gulf.....	100	10,368.48	44	6,596.33	2	236.38	1	59.84	11	11,464.55
Pacific.....	19	1,208.93	9	1,720.00						
Great Lakes.....	18	8,187.22	22	2,802.58			3	9,777.68	13	31,382.91
Western Rivers.....			15	3,611.70						
Total.....	137	19,764.58	90	14,730.61	2	236.38	4	9,837.52	24	42,847.46
PREVIOUS QUARTER.										
Total sail.....	141	29,602.10					65	9,651.20		
Total steam.....	116	57,814.45					59	18,518.48		
Grand total.....	257	87,416.55					124	28,169.68		



## CORRESPONDENCE.

We do not hold ourselves responsible in any way for the views or opinions expressed by our correspondents. It is our desire that all sides of any question affecting the interests or welfare of the lake marine should be fairly represented in THE MARINE RECORD.

## WHERE ARE WE AT?

To the Editor of The Marine Record:

It seems from the last issue of your journal—June 29—that our friend G. W. L. is becoming hypercritical. He objects now to calling those courses that pass through cardinal points rhumb-lines, and quotes some authorities to support the idea.

But he and the authorities whom he quotes should know that this is an unsurmountable, untenable and unnecessary distinction. Not one of the 14 definitions quoted in his letter to THE MARINE RECORD for May 28 recognizes any such distinction, but, on the contrary, some of them distinctly teach the contrary.

Thus, "rhumb," "Any straight line on the chart (Mercator projection) represents a rhumb-line," etc.—U. S. C. and Geodetic Survey Report. This authority should be sufficient on this point.

Our friend should remember that all regular curves—and the rhumb-line is one of them—have what are known as "singular" points, *i. e.*, points in which the curve has some features or characteristics that it has not in other positions. To illustrate: Say that we, in north latitude, have a ship's track running due east a given distance. This track, on the earth is the arc of a true circle. Now conceive this track, which is concave to the left, to be swung bodily to the left about its western extremity; the curvature will begin immediately to be diminished, and more rapidly in the lower than in the higher latitude. This reduction in the curvature will be continued till the meridian is reached, when that element that measured the curvature *vanishes*, and the rhumb or track of ship becomes a right line.

The swing of the rhumb-line being continued, that element of the curve that "*vanished*" on the east side of the meridian reappears on the west side, but with a contrary sign—*i. e.*, the rhumb has become concave to the right—*i. e.*, the direction of flexure is changed.

So when the curve passes the prime vertical, or east-west point, the flexure of the curve changes direction again, the convex side always being towards the prime vertical, and the concave side always towards the meridian, yet in all these different positions the curve is represented by a right line on the Mercator chart, and is always indicative of the correct course of ship. So that notwithstanding the opinion of our friend and the four eminent authorities quoted to the contrary, we must still regard any right line on the Mercator chart as a "rhumb-line."

Mr. G. W. L. is very anxious that I should know that there is but one kind of rhumb-line, and brings up a formidable array of authority in support of that idea. It is quite certain that most of the authorities quoted recognize but one rhumb-line, and in the sense as understood by them, and as correctly defined by the American Practical Navigator (Bowditch), there is but one; but it does not follow that therefore there is no other line having precisely the same conditions with the several lines which it crosses, as does the orthodox rhumb with the several lines which it crosses.

This orthodox rhumb, or geographic rhumb, crosses all the geographic meridians, within its limit, on the same angle for any given course.

The ship's track (magnetic rhumb) crosses all the magnetic meridians within its limit, on the same angle, for any given course. And what is more, the angle of the rhumb for any course, is identical in value, on any geographic meridian, with the angle of the ship's track on the corresponding magnetic meridian.

In other words, the angle of the rhumb for any course, is precisely equal to the angle of the ship's track (magnetic rhumb) for the same course.

Here are two lines, separate and distinct, one a right line, the other a curve (on the Mercator chart) that, when referred to their respective meridians, answer precisely the same conditions or requirements.

Now, if I may not call the ship's track a magnetic rhumb, will our friend G. W. L. tell us what we may call it? I am not particular about the name, if it will recognize the difference between the rhumb-line, as commonly understood, and the ship's track.

This difference is what I want brought out where it can be seen and measured, and be made a visible, tangible quantity. A little note of further, or supplemented instruction on our excellent charts, would remove this long-endured stumbling block from further annoying our shipmasters.

H. C. PEARSONS,  
Ferryburg, Mich., June 29.

## BUILDING OF RACING SHELLS.

(CONTINUED FROM PAGE 7.)

of greater importance. An expert sculler will have his shell built to suit himself and rigged to fit his arms, legs, etc.; why then should we expect amateurs to be without individuality and force them to accommodate themselves to the riggings, instead of vice versa?

Looking more critically into reasons and causes, we find the deplorable condition that a tacit combination seems to exist among those in power to kill off all new departures as long as they do not emanate from themselves. The college oarsmen do not stay long enough to even learn to understand the principles involved in rowing, and while there are a great many able men among them, they have not time to even suspect the importance of the mechanical and other great truths which seem paradoxical to the casual observer. The inventor is, however, not always to be found among the college-bred coaches, and as a result, we find at the present time the riggings used by our leading college crews behind the times. It would be requiring considerable space to go into the details of the state of affairs at the different universities, but from all indications it is safe to say that there appears to be a glimmer of radical change on the horizon.

The literature on matters pertaining to rowing is actually the worst and most meager imaginable, considering the universality of the practice. What has appeared in late years is hardly worth mentioning, yet it is a recognized fact that as an exercise, the art of rowing is given first rank. But in order to be an exercise and to be beneficial, not enough attention can be given to the details of riggings in order to insure normal development of muscles, and not, on the contrary, produce spinal troubles and other ailments. With the ordinary sweep, for instance, and a man always pulling on the same side of the boat, an abnormal, one-sided development cannot be avoided, and the physicians will hail the new swivel oar invented by M. F. Davis, allowing the equal use of both arms, with delight.

No man has brought the racing shell as now used to such scientific perfection as M. F. Davis, who for nearly thirty years as amateur, professional oarsman, builder, coach, and especially inventor, has been a succession of surprises to the aquatic profession. It was he who first used a sliding seat, the swivel rowlock. It was he who first taught Donaghue to make a racing oar, advertised by this man for years as Davis' patent; he who invented the present rowing shoe, the hollow oars, the metal button, the rubber rowing handle, the water-proof cedar planking, the anti-crab attachment for oars, the three-rod outrigger, etc., and to-day he appears with another surprise of the greatest importance, the "Swivel Oar," which will undoubtedly revolutionize accepted theories and methods.

The writer was favored with a glimpse of the new things still in store by a representative of the Detroit Boat Works, who have taken hold of all of Mr. Davis' patent devices and are now supplying the demand for them on a large scale. Their doing so has freed Mr. Davis sufficiently that he may now devote his time to perfecting a large number of inventions still in the experimental stage.

The writer inspected at the Detroit Boat Works a number of shells partly under construction, partly ready for shipment. Singles which weighed complete with all rigging less than 25 pounds, doubles of less than 42 pounds, fours less than 90 pounds, and an eight of less than 200 pounds, while they are prepared to reduce single to 21 pounds, pairs to 40 pounds, fours to 88 and eights to 195 pounds. In comparing these weights with those of other makers, it must be emphasized that they include outriggers and locks, generally not counted. As a single is over 30 feet, and a four 46 feet in length, these light constructions could only be obtained by the most careful selection and combination of parts. All previous attempts by others to build light shells have

invariably resulted in weak boats, while the Detroit shells, even the long eights (68 feet in length) can be carried at the two extreme ends without risk or showing undue strain. The Wyandotte crew pronounce their new Detroit shell of 95 pounds weight, incomparatively stiffer than the 160 pounds shell they rowed last year. This result as mentioned is obtained by careful studying every minute part as to load and varying strains.

The planking is composite, in singles less than one-thirteenth of an inch in thickness, combining the advantages of the natural elasticity of the cedar with the toughness of the paper, without the fault of the former being early split, or of the latter of being in time saturated with water and becoming loggish and soft. No professional or expert will use paper in matched races.

The gunwales and keelsons in these boats are in one length, and the internal bracings consist of a system of diagonals, made of hollow tubing of exceedingly light gauges, increasing in diameter toward the cockpit. There they connect with metal brackets and outriggers in such manner that strains from one side equalize those from the opposite. In the old and still commonly used types of shells, the sides of the cockpit are utilized as indispensable members of construction and have to support the outriggers solely, which requires them to be made at least from  $\frac{3}{8}$  to  $\frac{1}{2}$  of an inch in thickness, while in Davis' shells, the only function of these sides is to keep out the water, and they are consequently reduced to less than  $\frac{1}{8}$  of an inch in thickness. In these shells the parts are mostly interchangeable, all metal parts are metal to metal, and outriggers can be raised or lowered at once without the application of washers.

The footboards are adjustable, the steering gear is self-locking, the seats have curved tracks and are anti-frictional, and have improved flexible tops. The oarlocks are adjustable to any desired angle of anchorage of blade, and their pivots have adjustable bearings. They have an attachment against crabbing and easily replaced leather buffers on which the metal buttons on the oars play without friction, lost motion or noise.

The model of the shells is one of least resistance, sections being of semi-concentric shape, while Mr. Davis has always advocated length as the prime element for speed.

We now return to the new swivel oar which the writer had occasion to inspect. The accompanying cut shows this oar in action. It enables the rower to use both arms equally, to maintain an approximate, uniform motion fore and aft in rowing, to gain from extreme forward to extreme after position with same length of oar outboard as ordinarily used (32 inches), to lift oars higher out of the water in rough seas, to bring the oarlock closer to the water, as the gooseneck will pass over the knee where an ordinary oar would strike, etc., while no advantage of the old oar is lost. Any of these points would be of sufficient importance to invite attention, and while expert oarsmen have only one voice in its favor, and are vying in speculating on its merit, some of our college coaches have deemed it wise to ignore its arrival, since it did not come from England, "you know."

In this connection it is interesting to note a report from Henley, saying that coach Bob Cook spent two hours to teach his crew from Yale the Cook catch, which means the proper entering of blade after recovery. A simple device invented by Davis, and attached to the oar, insures the proper catch automatically, surer than any expert could learn to perform it with years of practice, yet two valuable hours on the eve of an important international race are wasted to learn what any novice could perform unconsciously with the Davis device without tuition.

The remarkable success which M. F. Davis has had in this line is due to his inventive turn of mind, his pugnacious nature, his ability as an expert oarsman to personally try and manufacture all parts entering into the construction, his conservative way to never overestimate his own merits and inventions, and to never try to put them on the market until thoroughly tried. His inventions have been most shamefully appropriated by infringers, and he is to be congratulated to have found with the Detroit Boat Works, who have taken hold of the manufacturing of his inventions, a concern that will guard his interest.

HUGH M. MCCORMACK.

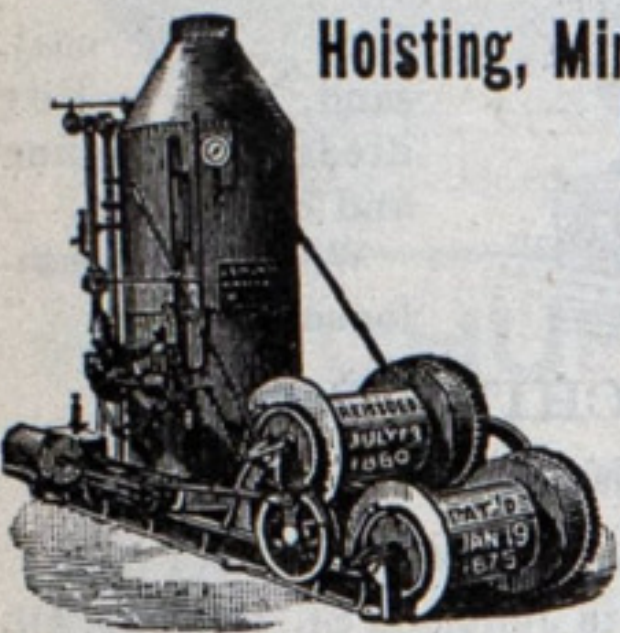
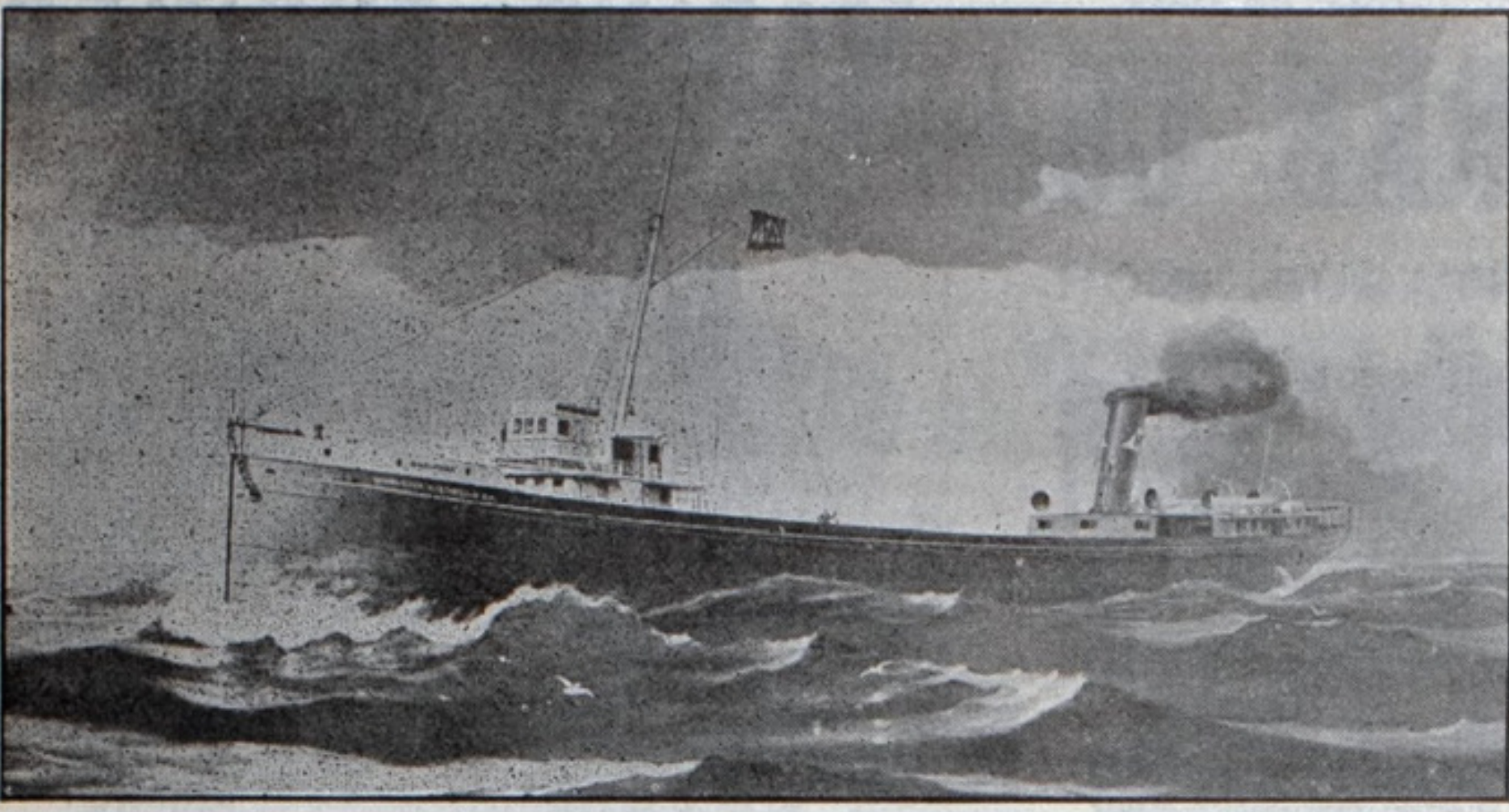


## GRAHAM'S

Rapid Fueling Docks,  
Detroit River, foot 21st Street.

No interference from Passenger or Car Ferry Lines.  
Full supply of BEST STEAM COAL always on hand.  
Wide stretch of river and plenty of water at dock. POCKETS and CHUTES  
arranged for various types of vessels, allowing QUICK DISPATCH day or night.

JAMES GRAHAM, DETROIT.



Hoisting, Mining Bridge Erecting  
Dock Building, Pile Driv-  
ing, Coal Hoisting and  
Quarry Engines.

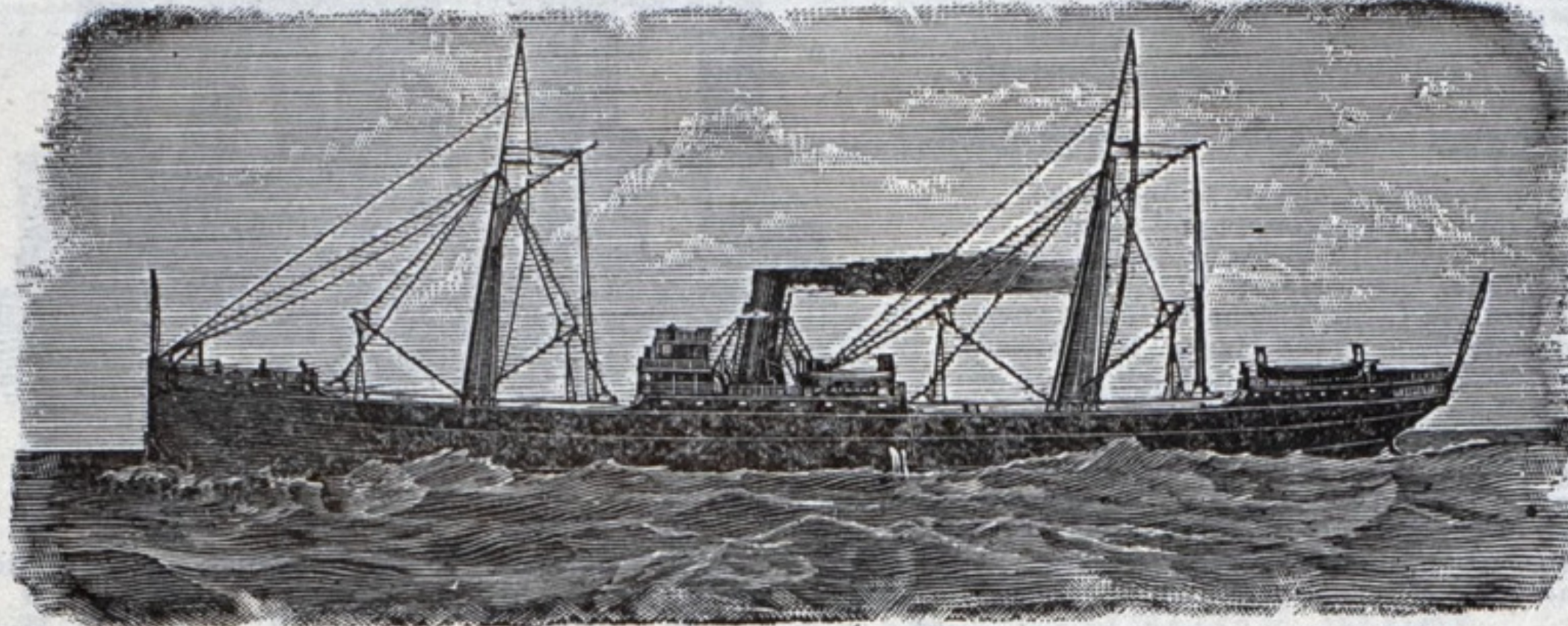
of any power, sugar cane  
transferring engines,  
transferring machines  
for depositing cane  
from car to carrier, with  
my improved Patent  
Friction Drums, with  
or without Boilers. Any  
amount of reference  
given. Established 1870.

Send for Catalogue. J. S. MUNDY, Newark, N. J.  
1744 Market St., Philadelphia, Pa.  
22 Light St., Baltimore, Md.  
117 Water St., Pittsburgh, Pa.  
249 South Jefferson St., Chicago, Ill.  
715 North Second St., St. Louis, Mo.  
39 Magazine St., New Orleans, La.  
34 Fremont St., San Francisco, Cal.  
85 Front St., Portland, Oregon.  
218 Congress St., Boston, Mass.

## F. W. WHEELER &amp; COMPANY.,

BUILDERS OF ALL KINDS OF

IRON, STEEL AND  
WOODEN SHIPS,  
FOR LAKE OR OCEAN SERVICE.  
West Bay City, Mich.



F. W. WHEELER, Prest. E. T. CARRINGTON, V.-Prest  
C. W. STIVER, Secretary & Treasurer.

FRONTIER IRON WORKS,  
MARINE ENGINES,  
DETROIT, MICH.

INCORPORATED 1794.

## Insurance Company of North America.

CAPITAL, PAID UP IN CASH, - - - \$3,000,000.00.  
ASSETS, - - - 9,487,673.53.

CHARLES PLATT, President,  
EUGENE L. ELLISON, 2d Vice President.

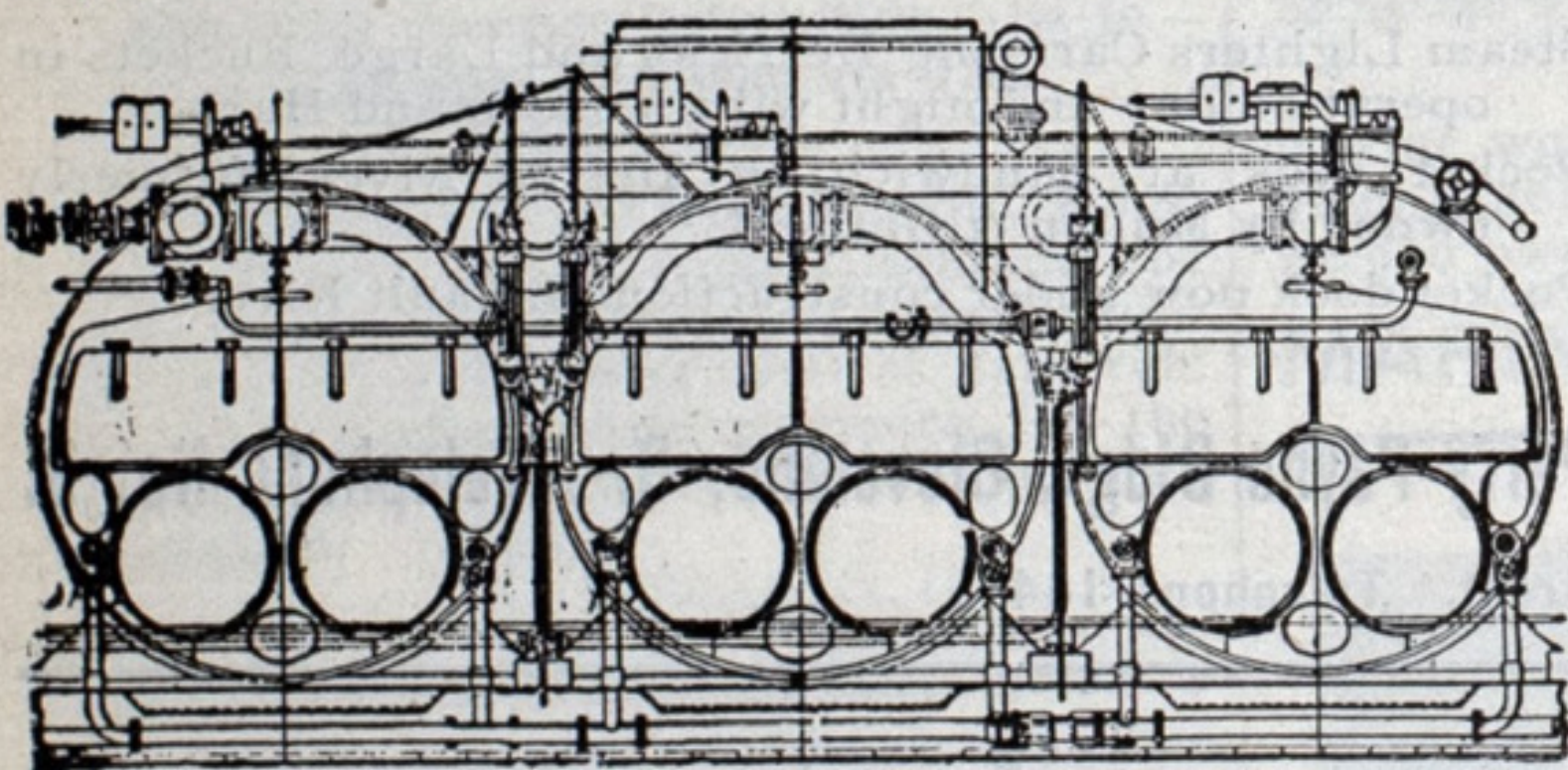
JOHN H. ATWOOD, Assistant Secretary.

WILLIAM A. PLATT, Vice President,  
GREVILLE E. FRYER, Sec'y and Treas.

GEORGE L. MCCURDY, MANAGER,  
CHICAGO, ILL.

Lake Marine Department.

## LAKE ERIE BOILER WORKS



The best equipped  
plant in America for  
the manufacture of  
**MODERN  
MARINE  
BOILERS.**  
BUFFALO, N. Y.

## PINTSGH GAS LIGHTED BUOYS.

Adopted by the English, German, French, Russian,  
Italian and United States Light-House Departments  
for channel and harbor lighting; over 500 gas buoys  
and gas beacons in service.

BURN CONTINUOUSLY from 80 to 365 days and nights without attention, and  
can be seen a distance of six miles.

BRILLIANT AND STEADY ILLUMINATION.  
ECONOMICAL AND RELIABLE IN OPERATION.

Controlled by the **SAFETY CAR HEATING AND LIGHTING CO.,**  
160 Broadway, NEW YORK CITY.

MARINE AND INLAND INSURANCE.

## Atlantic Mutual Insurance Co.,

Organized 1842. Office 51 Wall Street, NEW YORK.

Insures against Marine and Inland Transportation Risks and Issues Policies  
making Loss Payable in England.

Assets over \$10,000,000 for the Security of its Policies.

The profits of the Company revert to the assured, and are divided annually upon the premiums terminated  
during the year; thereby reducing the cost of insurance. For such dividends, certificates are issued bearing interest  
until ordered to be redeemed, in accordance with the charter.  
J. D. JONES, Pres. W. H. H. MOORE, Vice Pres. A. A. RAVEN, 2d Vice Pres. J. H. CHAPMAN, Sec.

## IN THE LEAD

Is a coveted position.

## MULLINS' METAL BOATS

Have secured it. They are light, durable, non-  
sinkable, low in cost, need no repairs. Send in  
your order at once.

CATALOGUE ON APPLICATION.  
W. H. MULLINS, 252 Depot St., Salem, O.



"GET THERE" DUCKING BOAT.



DOUBLE ENDER PLEASURE BOAT.

## FOR SALE.

SLOOP  
YACHT.

Bran new, 29 feet over all, 17 feet  
on the water, 8 feet beam, has fin  
keel with 1,000 pounds of lead on  
the same, new set of sails, air  
chambers enough to float her in  
case of accident, under deck and  
out of sight, can easily beat any  
boat of her class owned in Toledo,  
O., where there are some of the  
fastest on the lakes. For further  
particulars apply to Lock Box 291,  
Toledo, O.

LONG SERVICE  
WIDE RANGE  
SELLERS' RESTARTING INJECTOR  
SIMPLEST AND BEST  
HOT WATER  
LONG SERVICE

For Stationary, Portable,  
Traction Engines, Tugboats, &c.  
Thoroughly Reliable—Perfectly Automatic.  
JENKINS BROS., - Selling Agents,  
NEW YORK, BOSTON, PHILA., CHICAGO.

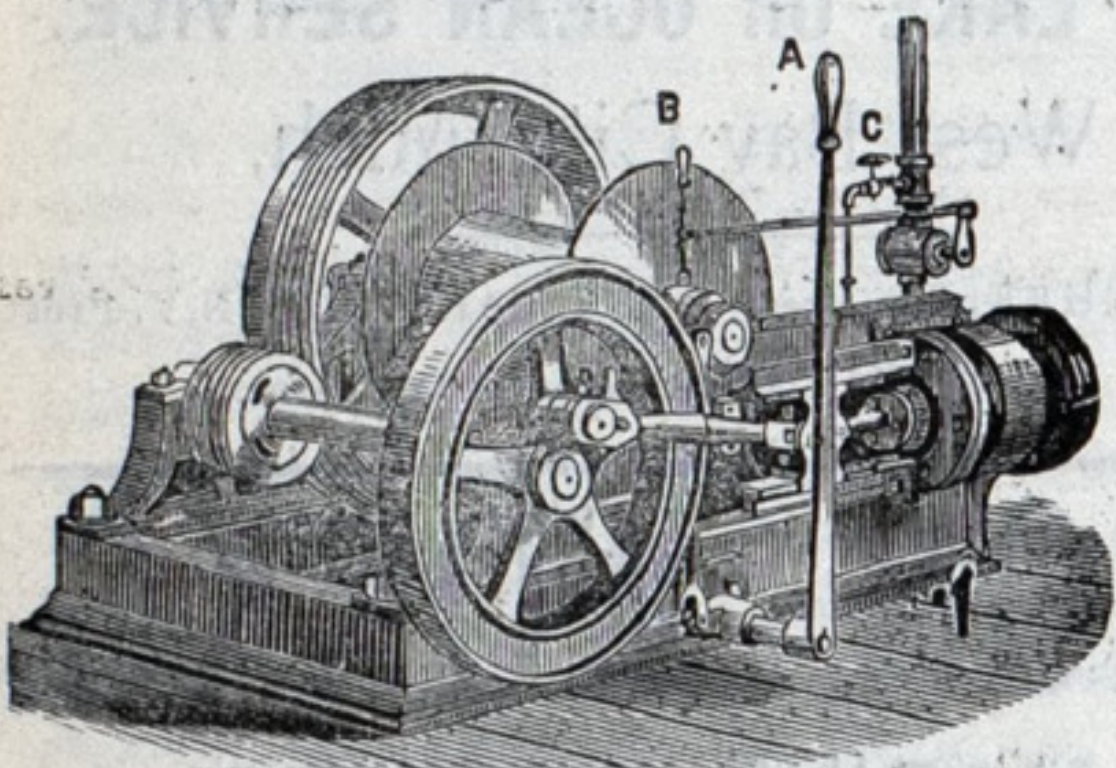


**MARINE ENGINEERING**  
(Stationary and Locomotive Engineering), Electricity, Architectural and Mechanical Drawing, Plumbing, Heating, Mining, English Branches, etc.  
**TAUGHT BY MAIL.**  
Engineers can qualify to obtain licenses. To enroll only necessary to know how to read and write. Circular free. State subject you wish to study. The International Correspondence Schools, SCRANTON, PA.

**A. J. MORSE & SON.**  
DIVING APPARATUS  
140  
CONGRESS ST. BOSTON.

**WILLIAMSON BROS.,**

Cor. Richmond and York Sts., PHILADELPHIA, PA.



**HOISTING ENGINES and SHIP STEERING ENGINES.**

With either Frictional, Spur or Worm Gear of various Patterns to suit all purposes.

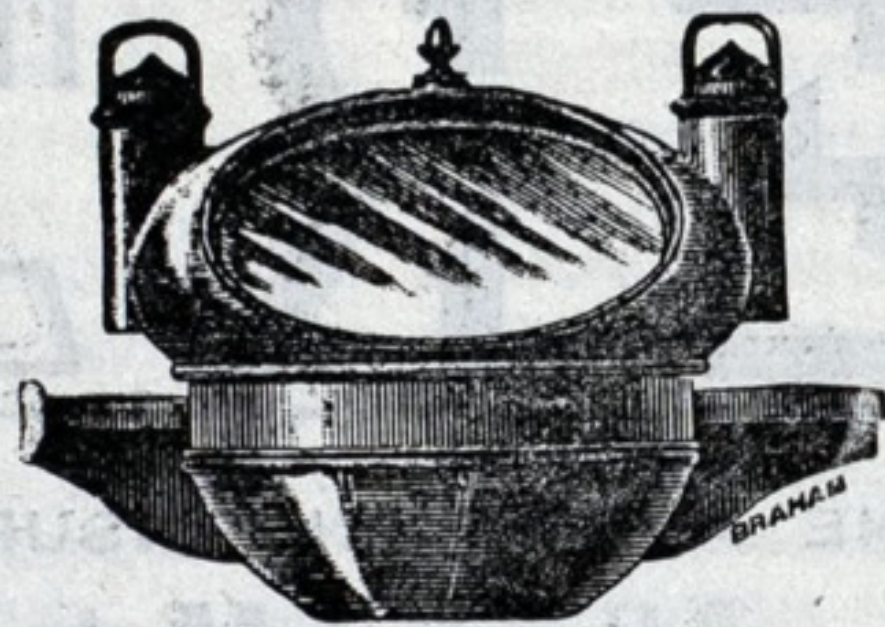
ESTABLISHED 1871. INCORPORATED 1893.  
**MONTAGUE IRON WORKS CO.,**  
MANUFACTURERS OF  
**Marine and Stationary Engines**  
AND BOILERS OF ALL KINDS.

Heavy Castings a Specialty. Prices Quoted on Application.  
Fore and Aft Compound Marine Engines.

The Engines in the following boats are of our manufacture

Tug, Hunter, Chicago, 15 and 28x22.  
Tug, Tacoma, Chicago, 16 and 30x24.  
Tug, Zenith, Duluth, 18 and 36x30.  
Steamer Glenn, South Haven, 14 and 28x20.  
U. S. Survey Steamer, W. S. Hancock, 12 and 21x20.  
Steamer Pine Lake, Charlevoix, 16 and 30x24.  
Passenger Steamer Pilgrim, St. Clair, 14 and 28x20.  
Steam Barge Iona, Grand Haven, 24 and 46x42.  
Steam Barge M. T. Greene, Chicago, 20 and 36x36.  
Steamer H. W. Williams, South Haven, 18 and 36x30.  
Steam Barge Mark B. Covell, Manistee, 18 and 30x26.  
Steam Barge Isabella J. Boyce, Michigan City, 19 and 32x26.  
Steam Barge Luella H. Worthington, Cedar River, 19 and 36x30.  
Passenger Steamer City of Kalamazoo, South Haven, 20 and 40x30.  
Steamer Oval Agitator, Chicago, 14 and 28x20.  
Tug E. G. Crosby, Muskegon, 16 and 30x24.  
Tug Peter Coates, Sault Ste. Marie, 10 and 20x16.  
Steamer Lorain L., South Haven, 12 and 21x16.  
Passenger Steamer Lotus, Escanaba, 16 and 30x24.  
Steam Barge Sachem, Grand Haven, 21 and 38x36.  
Passenger Steamer Bon Ami, Saugatuck, 14 and 28x20.  
Steam Barge Charles A. Street, Chicago, 20 and 36x36.  
Steam Barge Edward Buckley, Manistee, 18 and 36x30.  
Passenger Steamer E. G. Maxwell, Pentwater, 14 and 28x20.  
Passenger and Freight Steamer Bon Voyage, Saugatuck, 16 and 30x26.  
Passenger and Freight Steamer Mabel Bradshaw, Muskegon, 16 and 28x26.  
The engraving represents our 20 and 36x36 Fore and Aft Compound Marine Engine. We build them all sizes and guarantee them to give satisfaction. Prices furnished on application.

**MONTAGUE IRON WORKS CO., Montague, Mich.**



**FRANK MORRISON, COMPASS ADJUSTER**

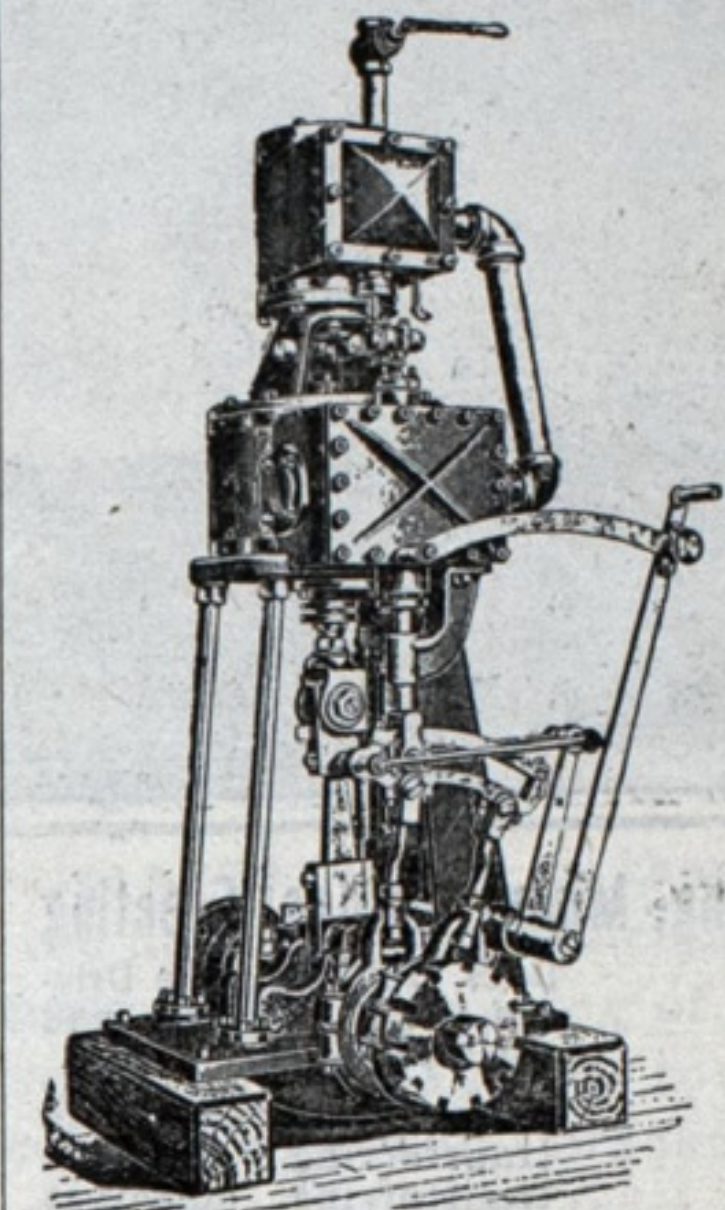
—AND MANUFACTURER OF—  
**NAUTICAL INSTRUMENTS.**

COMPASSES. BAROMETERS. PATENT LOGS. BINNACLES. STEAM GAUGES. MARINE GLASSES. ENGINE INDICATORS.

All Nautical Instruments Carefully Repaired.

Office with Upson, Walton & Co., 161 River St., Cleveland, O.

**MARINE ENGINES**



**SINGLE AND COMPOUND.**

5 TO 200 HORSE-POWER. These engines are high-class in workmanship and material and moderate in price. Send for cuts, description and prices.

**Centrifugal Pumps**

For raising coal, sand, &c. For dredging, wrecking and circulating. Write for catalogue.

**MORRIS MACHINE WORKS,**

Baldwinsville, N. Y.

UNION & HUBBELL, Agents,

61-69 North Jefferson St., Chicago, Ill.

ABRAM SMITH.

ANGUS H. SMITH.

**ABRAM SMITH & SON,**

**SHIP-BUILDERS,**  
ALGONAC, MICH.

Wooden Ships of any description built rebuilt, or repaired.

Send for specifications, prices, etc.  
Good slips for laying up boats.

Extra 4th of July Schedule.

The Nickel Plate Road will run train 19 leaving Cleveland 3:30 a. m. through to Vermillion, account special attractions at Shadducks and Linwood Parks. 139-27

**JEFFERY'S MARINE GLUE**

Can be Obtained from the Following Well-known Firms

L. W. Ferdinand & Co., Boston, Mass.  
Howard H. Baker & Co., Buffalo, N. Y.  
Geo. B. Carpenter & Co., Chicago, Ill.  
H. D. Edwards & Co., Detroit, Mich.  
Upson-Walton Co., Cleveland, O.  
M. I. Wilcox Cordage and Supply Co., Toledo, O.

Send for Circulars and Samples.

**THE W. L. SCOTT CO.**

WHOLESALE DEALERS IN

**SHAMOKIN. WILKESBARRE, AND HAZLETON LEHIGH**

**COALS**

...**MANSFIELD STEAM COAL**

Fueling Steam Vessels a Specialty.

Dock and Office at Canal Dock.

Either from Dock or Steam Scow Mansfield, capacity 300 tons, in buckets, which gives quick dispatch. Boats coaled day or night. Docks lighted with electricity and equipped with Steam Derricks.

**ERIE, PA.**

**The CUDDY-MULLEN COAL CO., Cleveland**

**DEALERS IN BEST GRADES OF STEAM COAL.**

**SPECIAL ATTENTION GIVEN TO STEAMBOAT FUELING.**

SHIPPING DOCK with Car Dumping Machine, also eight chutes holding 100 tons each, for Rapid Fueling within Eastern Arm of Breakwater, Cleveland.

Steam Lighters Carrying Derricks and Large Buckets in operation day and night within Cleveland Harbor.

Pocket dock at Sandwich on Detroit River, formerly owned by Mullen & Gatfield.

Pocket dock now under construction on Sault River.

Main Offices, Perry-Payne Bldg., Cleveland, O. Telephone No. 8.

RIVER DOCK, West River Street. Telephone 1441.

**ROBERT E. HILLS,**

**Steam Fitting and Heating,**

Wrought Iron Pipe and Fittings, Engineers' Supplies; General Jobbing Work Done Promptly.

Also Proprietor of North Side Iron Works.

57 & 59 North Wells St. CHICAGO, ILL.

For the 4th of July festivities, the Nickel Plate Road will extend the Lorain Accommodation leaving Cleveland 3:30 a. m. to Vermillion. Celebration at Shadducks and Linwood Parks. One fare for the round trip. 137-27



**Handicapped**

**SOME BOATS ARE BADLY HANDICAPPED FOR WANT OF THE RIGHT KIND OF**

**FUEL**

We have the right kind at our Amherstburgh Dock, and will take good care of your wants if you will give us a chance.

**O. W. SHIPMAN,**

Office, 90 Griswold Street, DETROIT, MICH.

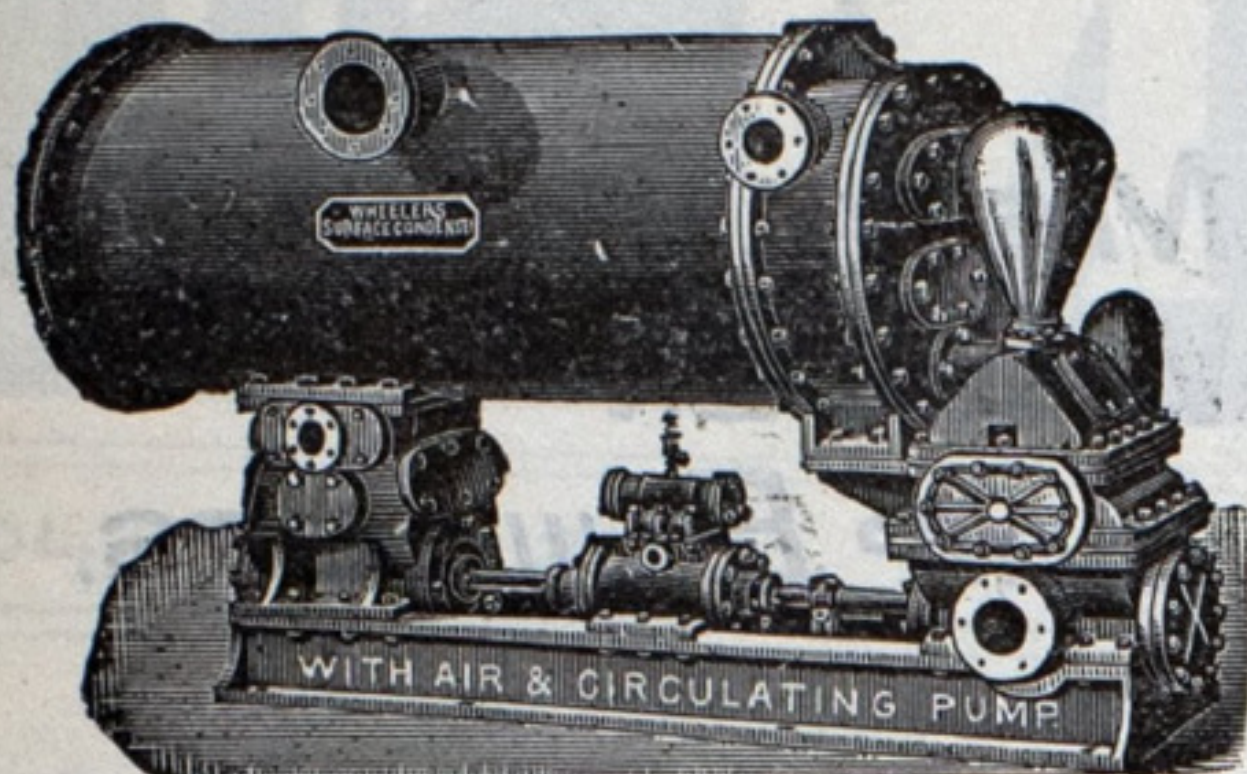


# Wheeler Condenser & Engineering Co.,

39 &amp; 41 CORTLANDT STREET, NEW YORK.

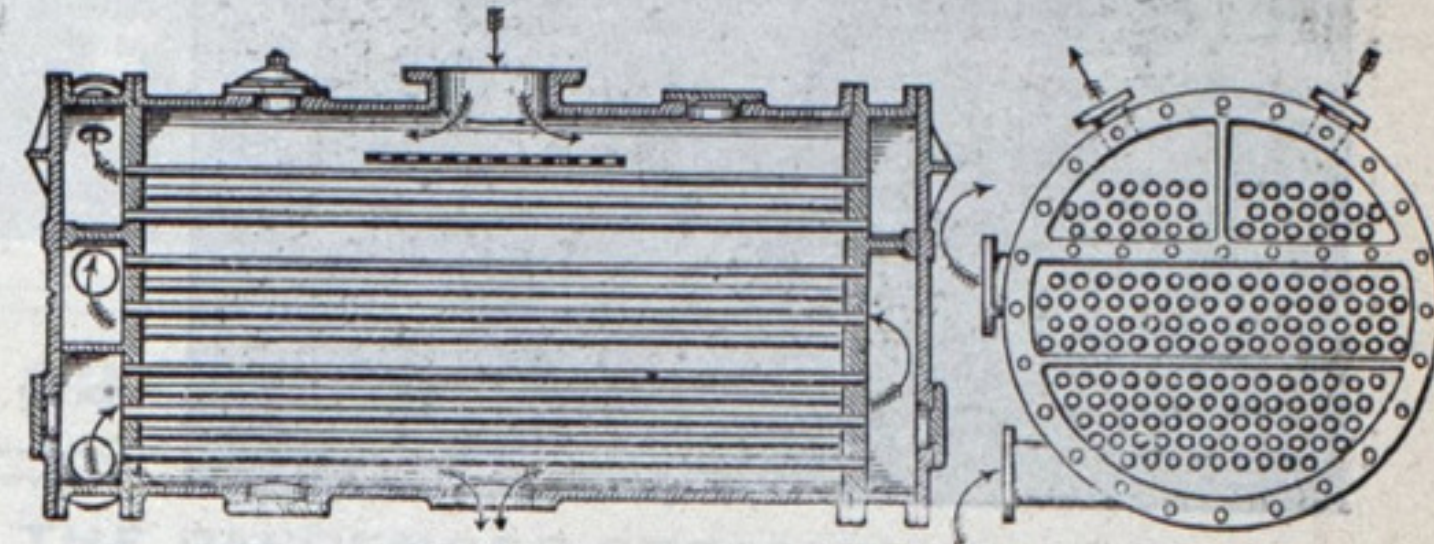
## WHEELER'S IMPROVED SURFACE CONDENSERS

Mounted upon Combined Air and Circulating Pumps.

WHEELER SURFACE CONDENSER,  
Mounted on Combined Air and Circulating Pumps.

Sole Proprietors and Manufacturers of the  
WHEELER STANDARD SURFACE CONDENSER.  
WHEELER ADMIRALTY SURFACE CONDENSER.  
WHEELER LIGHT HALL SURFACE CONDENSER.  
VOLZ PATENT COMBINED SURFACE CONDENSER AND  
FEED-WATER HEATER.  
WHEELER FEED-WATER HEATER, AIR AND CIRCULATING  
PUMPS.  
EDMISTON PATENT FEED WATER FILTER.

Send for Pamphlet, "Machinery for Small Boats, etc."

PATENT COMBINED SURFACE CONDENSER AND  
FEED-WATER HEATER.

## P. M. CHURCH & CO.

SAULT STE. MARIE, MICH.,

Ship Chandlery,  
Hardware, Paints, Oils,

And all classes of  
VESSEL SUPPLIES.

Coppersmith Shop in connection.

Corner Portage and Ashmun Sfs.

TELEPHONES: - OFFICE NO. 7.  
RESIDENCE NO. 4.

### Attention Vessel Men.

The undersigned has been appointed  
Receiver for the Vessel Owners' Towing  
Company, of Chicago, by the Circuit Court  
of Cook County, Illinois.

THE COMPANY OWNS THE FOLLOWING TUGS:

NAME.	Boiler Inches.	Engine. H.P.	Over all Length.	Keel Depth.	Beam. Feet.	Depth Feet.
A. G. Van Schaick..	15x78	22x22 82	67.5	14.6	8.1	
Protection.....	15x79	22x20 90	77.4	15.8	8.9	
Calumet.....	14x75	22x22 79	64.2	17.8	8.6	
D. T. Helm.....	14x72	21x17 83	68	18	9.3	
E. P. Ferry.....	12x72	20x20 80	66.8	15	7.6	
Black Ball No. 2..	12x72	18x20 73	58.6	15.5	8.4	
A. A. Carpenter ..	12x72	18x20 75	60	15.6	8.6	
Thomas Hood.....	13x72	18x20 71	59.5	15.6	8.6	
J. V. Taylor.....	13x72	18x21 75	60.8	15.6	8.6	
Satisfaction.....	12x72	18x20 73	58	15	8	
M. Shields.....	12x66	18x20 76	62	14.6	8.2	
Rebel.....	10, 6 x 60	16x18 66	54	14.6	7.8	

I will be pleased to receive offers at  
once for any or all of above tugs.

Yours very respectfully,

J. L. HIGGIE, JR.,

Receiver Vessel Owners' Towing Co.

Plan Your Summer Outing Now. Go to  
Picturesque Mackinac via THE  
COAST LINE.

It only costs \$13.50 from Detroit, \$15.50  
from Toledo, \$18.00 from Cleveland for  
the round trip, including meals and  
berths. One thousand miles of lake ride  
on new, modern steel steamers for the  
above rates. Send 2c. for illustrated  
pamphlet. Address

A. A. SCHANTZ, G. P. A.,  
Detroit, Mich.

Uniformed colored porters attend to the  
wants and comfort of first and second  
class day coach passengers on the through  
trains of the Nickel Plate Road. Rates  
lower than via other lines. 135-27

You save from \$1.50 to \$3.00 by pur-  
chasing tickets via the Nickel Plate Road.  
Solid trains and through sleeping cars  
between Chicago, Buffalo, New York and  
Boston. 136-27

## J. J. KEENEN, RIVERSIDE STEAM BOILER WORKS.



Marine, Locomotive and Stationary Boilers.

Marine Work a Specialty.

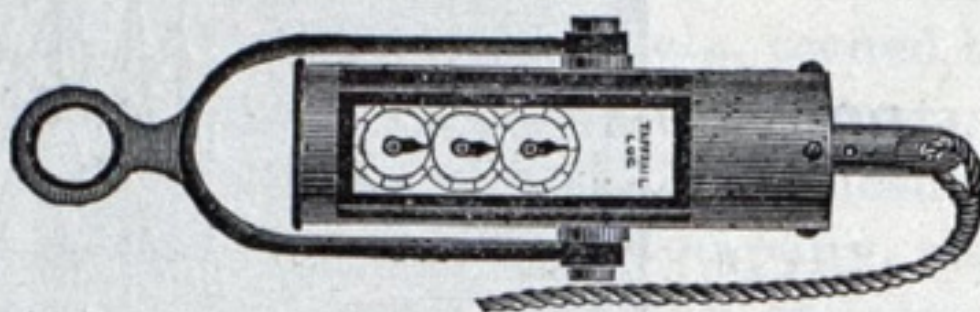
SHEET IRON WORK OF ALL KINDS.  
REPAIRING PROMPTLY ATTENDED TO.

Office and Works, Cor. Cologne and Fuller Streets,

CHICAGO.

Telephone, Canal 401

## ...The Bliss Taffrail Log

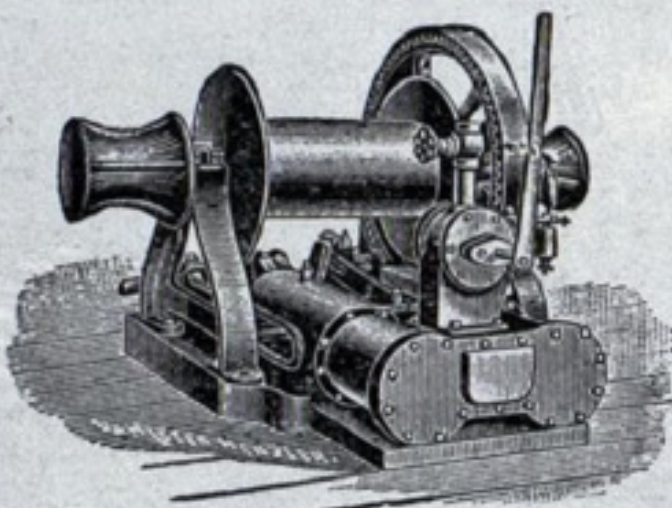


Over 11,000 sold.  
A portion are now made to indicate  
Statute Miles  
For use on the lakes.

Send us your old Bliss Register and we will alter it  
to indicate statute miles for \$3.50.  
There are poorly made imitations of our rotator.  
Buy only the Bliss Adjustable Rotator, stamped  
our name and patents. For sale by Ship Chandlers.

JOHN BLISS &amp; CO.

128 Front Street, NEW YORK



## Dock and Deck Hoists.

ALL KINDS OF

Machinery and Friction Hoists.

JACKSON &amp; CHURCH, Saginaw, Mich.

Send for Prices  
and Circulars.

## HOISTING ...ENGINES

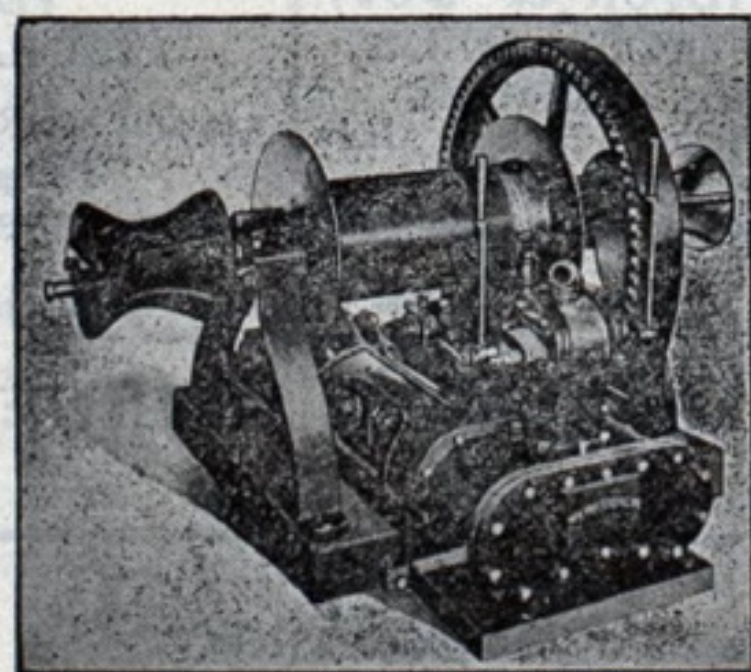


We build them in all sizes  
from new and improved  
designs. Every engine  
thoroughly tested before  
leaving our shop, and  
guaranteed to be satisfac-  
tory in every case. When  
in want of a Hoist for

marine work, dock work,  
mining or any other pur-  
pose, kindly permit us to name you prices. We know  
we can please you.

MARINE IRON CO.,

BAY CITY, MICH.



## DECK HOISTS

Coal and Contractors' Hoists,  
Steam Steering Gears and  
Conveying Machinery  
For all Purposes.

MANUFACTURED BY

W. H. WHITEMORE,

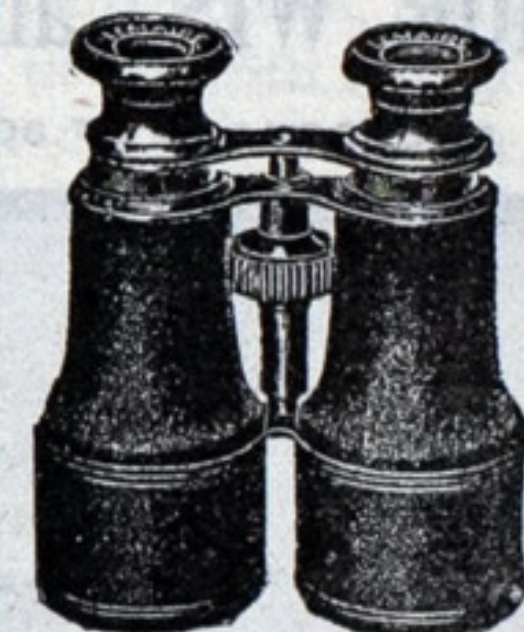
WRITE FOR PRICES.

WEST BAY CITY, MICH.



## MARINE GLASSES

BAROMETERS  
COMPASSES  
TELESCOPES

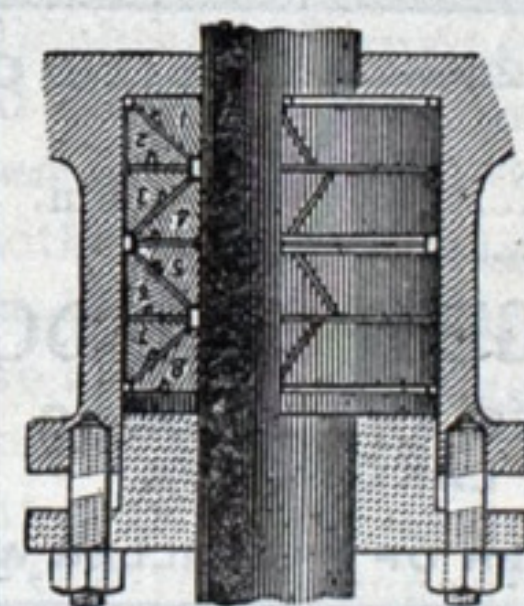


Bring Your Repairs to us.  
We Repair Everything  
in the Nautical Line.

FREE Our "card" rules for foretelling weather.  
Adapted for use with Auroid Barometer.  
Every vesselman should have one.

L. BLACK & CO., Opticians,  
156 Woodward Ave., DETROIT, MICH.

## Katzenstein Self-Acting Metal Packing



for Piston Rods, Valve Stems,  
Etc., of every description,  
for Steam Engines, Pumps,  
Etc. Adopted and in use by  
the principal Iron Works,  
Steamship Companies, Mills  
and Engine Builders, Elec-  
tric Light and Power Plants  
within the last twelve years  
in this and foreign Coun-  
tries. Also FLEXIBLE  
TUBULAR METALLIC  
PACKING for Slip-Joints  
on Steam Pipes and for Hy-  
draulic Pressure. Also  
METAL GASKETS for all sizes and shapes of  
flanges. Double-Acting Balanced Water-tight Bulk-  
head Doors for Steamers. Also Agents for the  
McColl-Cumming Patent Liquid Rudder Brake.  
L. KATZENSTEIN & CO., General Machinists,  
Brass Finishers and Engineers' Supplies, 357 West  
Street, New York, N.Y.

J. H. OWEN, Prest., Chicago. F. H. VAN CLEVE, Sec'y, Escanaba. Capt. GEO. BARTLEY, Supt., Escanaba.

## ESCANABA TOWING & WRECKING CO., Escanaba, Mich.

Tugs, Lighters, Steam Pumps, Hawsers, Hydraulic Jacks and Diving Appliances always ready

TUG MONARCH—Engine Compound, Cylinder 16 &amp; 30 in. diameter, 30 in. Stroke, Steam Pressure allowed, 125 lbs.

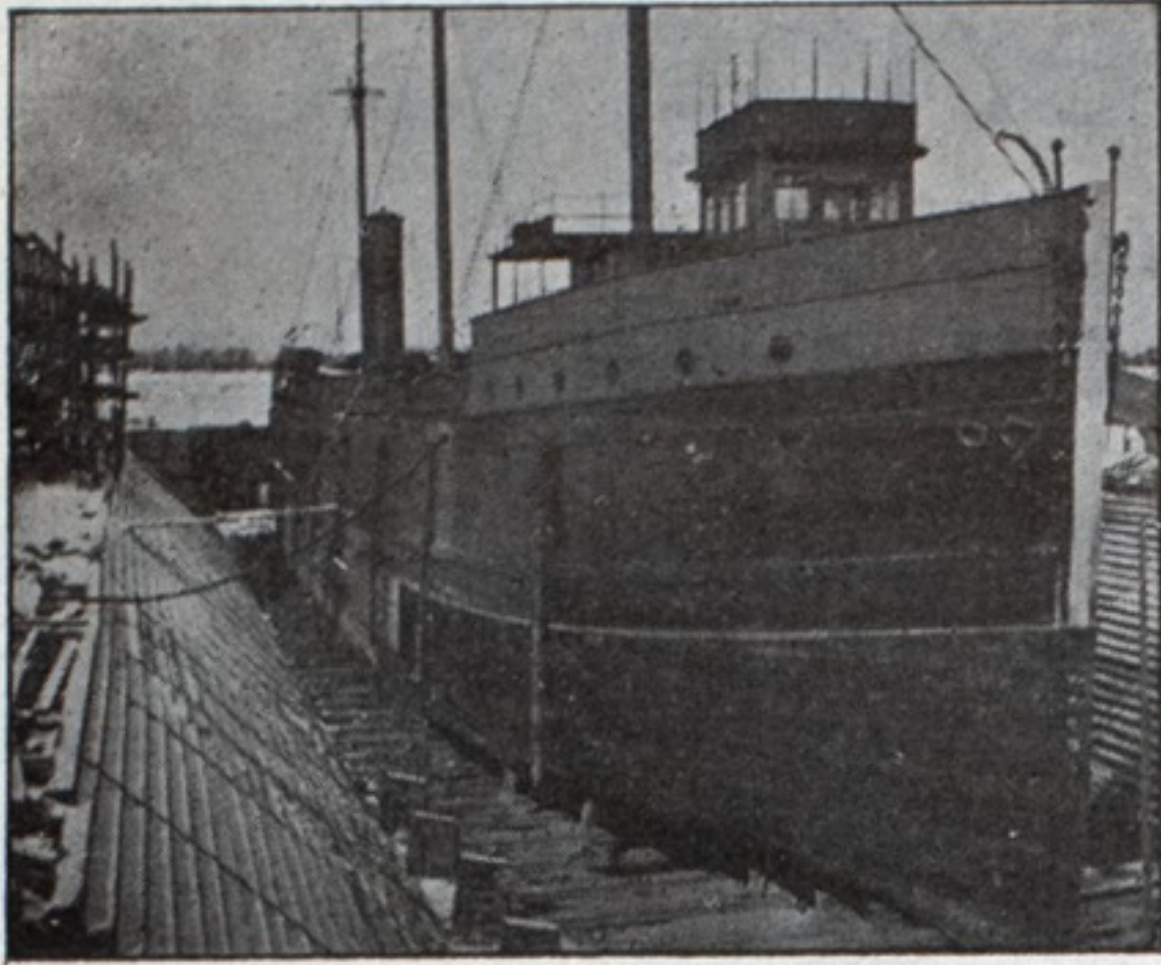
TUG DELTA—Cylinder 20 by 22. Steam Pressure allowed, 105 lbs.

TUG OWEN—Cylinder 20 by 20, Steam Pressure allowed, 104 lbs.

CENTRIFUGAL PUMPS.

SEVEN AND FOURTEEN INCH SUCTION.





# CRAIG SHIP BUILDING CO.,

TOLEDO, OHIO

New Dry-Dock 450 feet long, 110 feet wide on top, 55 feet wide on bottom, 16 feet water on sill.

**METAL  
AND WOODEN  
SHIP BUILDERS.**

Repairs to Metal and Wooden Ships  
A Specialty.

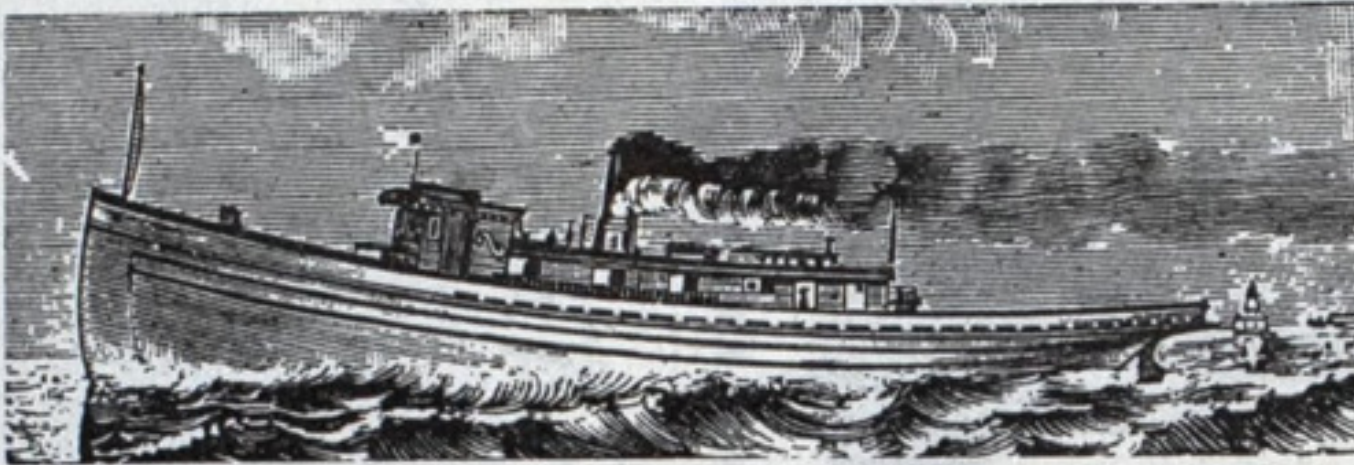
H. A. HAWGOOD, Pres't.  
PHILIP MINCH, Vice-Pres't.

C. A. MORGAN, Gen'l Mang'r.

J. A. SMITH, Sec'y.  
J. R. SPRANKLE, Treas.

## The Cleveland Tug Company,

First-class Tugs,  
Steam Pumps,  
Divers, Hawsers,  
Lifting Screws,  
Etc., furnished  
Promptly on  
Orders by Tele-  
graph or oth-  
erwise.



Steamers when  
outside wanting  
our Tugs, blow  
one long whis-  
tle and as many  
short ones as  
they want tugs.

OPEN DAY and NIGHT.  
Long Distance Telephone 725.

OFFICE 23 RIVER ST. 725.  
Cleveland, Ohio.



## The "CINCINNATI" Automatic STEAM STEERING GEAR

Simple, Powerful Machine. Noiseless and Sure. Send for Circular.  
FRONTIER IRON WORKS, Detroit, Mich.,  
AGENTS FOR THE LAKES.

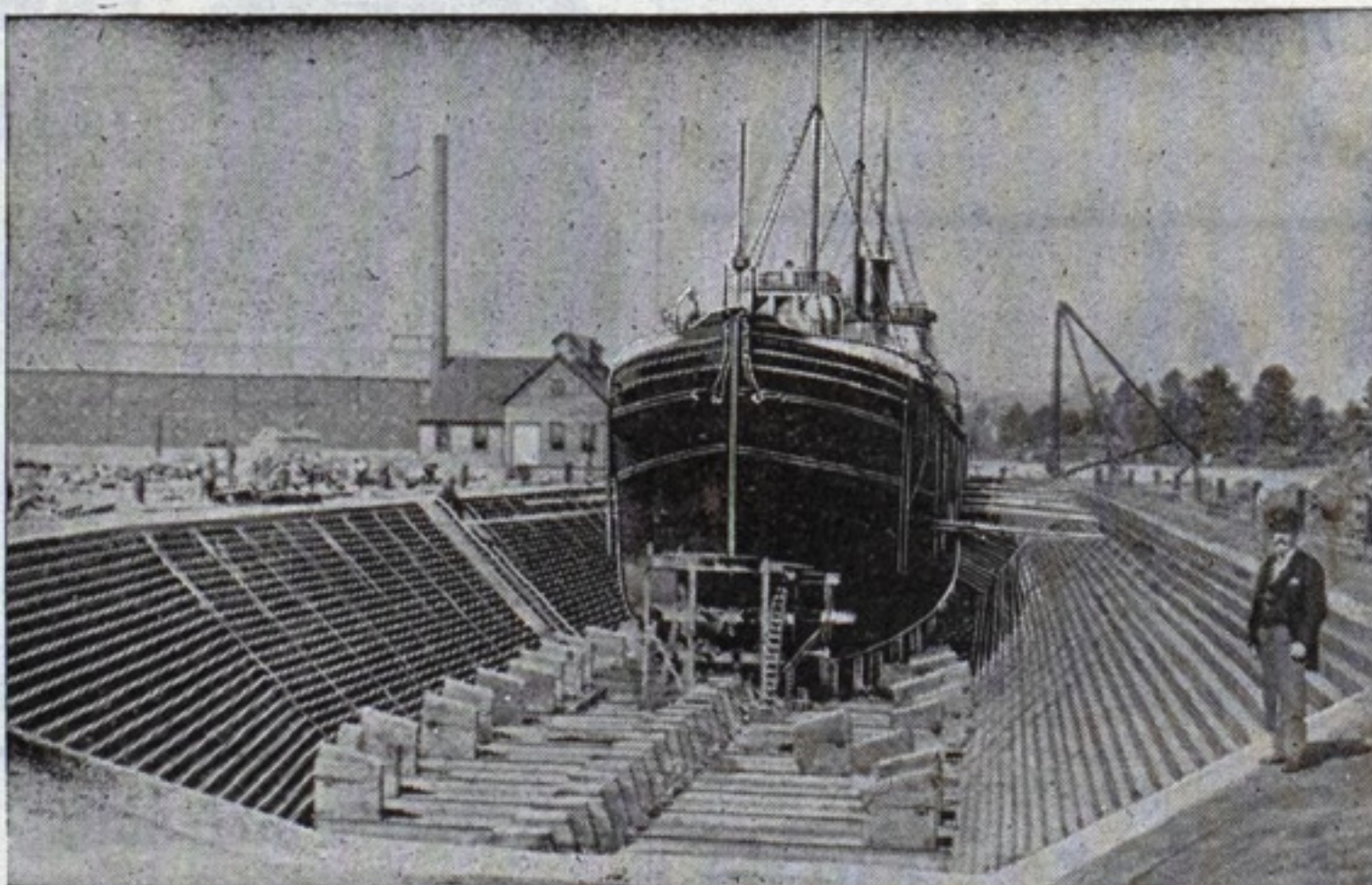
## AMERICAN STEEL BARGE CO.

### STEEL AND METAL SHIPS

OF ALL CLASSES BUILT ON SHORTEST POSSIBLE NOTICE AT OUR YARDS AT  
WEST SUPERIOR, WIS., and also at EVERETT, WASH.

PHOTOGRAPH OF 300 FT. BOAT IN DOCK.

Plates and  
Material  
Always on  
Hand to  
Repair all  
kinds of  
Metal  
Ships in  
Shortest  
Time.



Best  
Quality  
of Oak in  
Stock for  
Repairing  
Wooden  
Vessels  
of all  
Classes.

#### SIZE OF DOCK

Length, Extreme.....537 feet.	Entrance, Top.....55 feet 9 in.
Breadth, Top.....90 " 4 in.	Entrance, Bottom.....50 "
Breadth, Bottom.....52 "	Depth over Sills.....18 "

### LARGEST DRY DOCK ON THE LAKES.

PRICES FOR REPAIRS AND DOCKING  
SAME AS AT LOWER LAKE PORTS.

**SUPERIOR, WIS.**

A NUMBER OF PROPELLER WHEELS IN STOCK AT DRY DOCK.

## A. GILMORE'S SONS,

**DRY DOCKING  
SHIP BUILDING  
AND REPAIRING.**

EAST SIDE, NEAR IRONVILLE. - - - TOLEDO, O.

Dimensions of Dock, 236 feet long, 55 feet wide at top and 37 feet wide at gate.  
Nine feet water over sill.

RATES OF DOCKING, Ten Cents per Registered Gross Ton for Vessel over 200 Tons.

Jig Mill and Planer in connection with Dock.

PHONE NO. 157.

## Paint your Vessels with Superior Graphite Paint

NO BLISTERING, CRACKING OR SCALING.

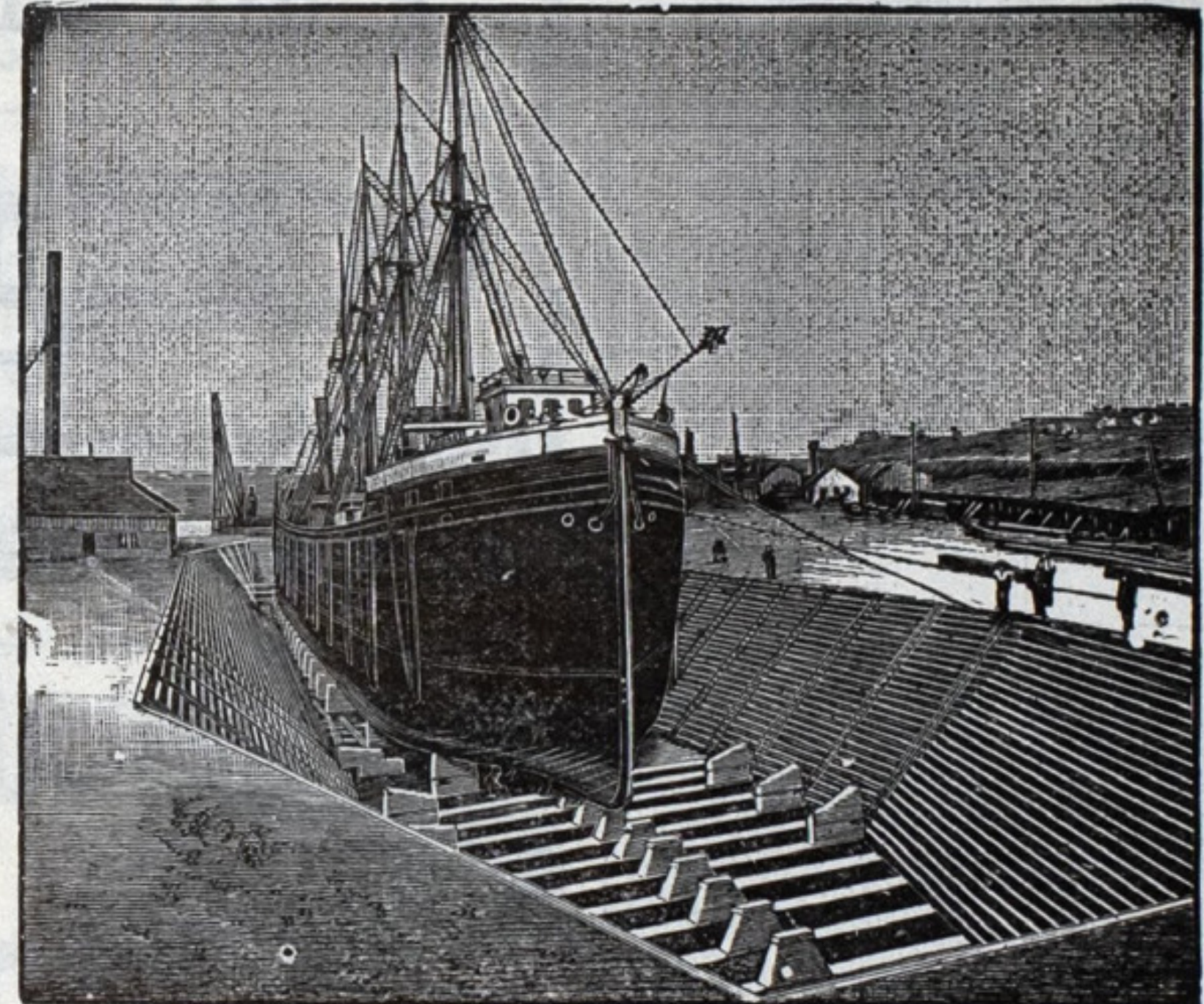
Made especially for Stacks, Decks, Sides, Hulls and Water Compartments.  
Strictly anti-rust, and most durable and economical.

DETROIT GRAPHITE MFG. CO. 542 River St., Detroit, Mich.

WHITTON & BATES, Agents, 503 Perry-Payne Building, Cleveland, O.

## THE SHIP OWNERS DRY DOCK CO.

Largest  
DOCK  
YARD  
on the  
GREAT  
LAKES.



Capacity  
with  
Two Docks  
to Dock  
the  
Largest  
Ships on  
the Lakes.

GENERAL REPAIR WORK PROMPTLY ATTENDED TO.  
Being equipped with Lucigen Lights we do work at night as well as day.  
TELEPHONE 1635- Foot of Weddell Street, CLEVELAND, O.

<p>ESTABLISHED 1857. <b>THOMAS MARKS &amp; CO.,</b> Merchants, Forwarders and Ship Owners. PORT ARTHUR, CANADA. N. B.—Special attention given to chartering vessels.</p>	<p>Calvin Carr. G. C. Blair. John Mitchell. <b>CARR &amp; BLAIR</b> VESSEL AND INSURANCE AGENTS, Rooms 1 and 2. Tel. Main 869. 12 Sherman St. CHICAGO.</p>	<p>A. A. Parker. James W. Millen. B. W. Parker. <b>PARKER &amp; MILLEN,</b> Vessel &amp; Insurance Agents. Iron Ore &amp; Coal Cargoes a Specialty. Rooms 3 &amp; 4 15 Atwater St., West. DETROIT, MICH.</p>
<p>Capt. J. A. Calbick Wm. H. Wood Telephone Main 3952. <b>J. A. Calbick &amp; Co.,</b> Vessel Agents and Underwriters. 6 Sherman St., CHICAGO. Capt. J. A. Calbick, Wrecking Mas- ter and Surveyor.</p>	<p>J. G. Keith. D. Sullivan. <b>J. G. KEITH &amp; CO.</b> VESSEL AND INSURANCE AGENTS, 140 and 141 Rialto Bldg. CHICAGO. Telephone No. 3658.</p>	<p><b>JOHN PRINDIVILLE,</b> VESSEL AND INSURANCE AGENT, 12 Sherman Street, Telephone Main 129. CHICAGO.</p>

**C. A. MACDONALD & CO.,**  
GENERAL MARINE INSURANCE AGENTS.  
RIALTO BUILDING, CHICAGO, ILL.

**THOS. WILSON,**  
MANAGING OWNER WILSON'S TRANSIT LINE,  
General Forwarder, Freight and Vessel Agent. CLEVELAND, O.

**C. R. JONES & CO.,** VESSEL AGENTS  
FIRE AND MARINE INSURANCE  
Nos. 501, 502 and 503 Perry-Payne Bldg., CLEVELAND, O.

JOHN MITCHELL. JOHN F. WEDDOW. ALFRED MITCHELL.  
**MITCHELL & CO.,** Vessel and Insurance Agents,  
Office Telephone, 767. 508-509-510 Perry-Payne Building,  
Residence John Mitchell, 3506. CLEVELAND, O.